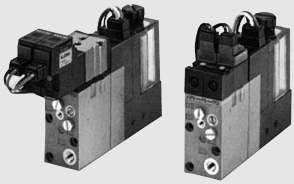
Adsorption Confirmation Switch

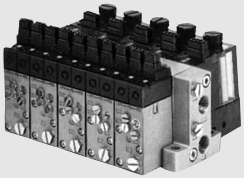
Series ZSP1

For General Pneumatics

RoHS

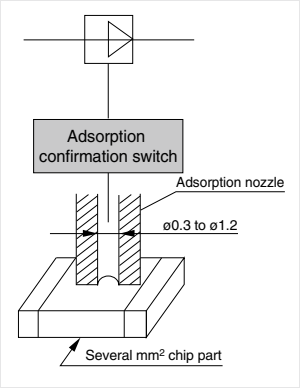
Can be integrated with ZX ejector system





Best suited for small diameter nozzles

ø0.3 to ø1.2



Suction filter comes as standard

Adsorption Confirmation Switch
Series ZSP1

RoHS

How to Order

Vacuum **ZSP1 – □ □ – 15 □**

Available nozzle diameter

S	ø0.3 to ø0.7
B	ø0.5 to ø1.2

Connection

0X	With suction filter M5 x 0.8 (For mounting on ZX ejector)
0XY	With suction filter M6 x 1 (Semi-standard) (For mounting on ZX ejector)

Output specifications

15	NPN open collector

Wiring specifications

Nil	Grommet type (Lead wire: 0.6 m)
L	Grommet type (Lead wire: 3 m)
C	Connector type (Lead wire: 0.6 m)
CL	Connector type (Lead wire: 3 m)
CN	Without connector

With Connector/How to Order

- Without lead wire (Connector 1 pc. Socket 3 pcs.) ····· **ZS-10-A**
- With lead wire ····· **ZS-10-5A-□**

Note) When ordering switch with 5 m long lead wire, Indicate both part numbers.
Ex.) ZSP1-□0X-15CN ·····1 pc.
ZS-10-5A-50 ·····1 pc.

Lead wire length

Nil	0.6 m
30	3 m
50	5 m

Replacement Element (Filter) Part Number (Refer to page 860)

- Filter vessel assembly (Filter vessel, filter element) ····· **ZX1-FK-PC**
- Filter element ····· **ZX1-FE**
- Filter gasket ····· **ZX1-FG**

Specifications

For details about the Pressure Switch Precautions, refer to pages 763 and 764. For details about the Specific Product Precautions, refer to the Operation Manual at SMC website.

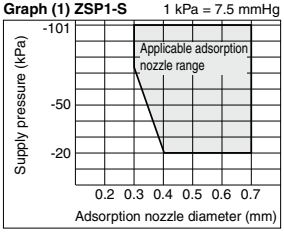
Model		ZSP1-S	ZSP1-B
Fluid		Air	
Rated pressure range		–20 to –101 kPa	
Applicable adsorption nozzle dia.		ø0.3 to ø0.7 (Refer to “Graph (1)” on page 860.)	ø0.5 to ø1.2 (Refer to “Graph (2)” on page 860.)
Hysteresis		0.5 kPa	
Internal orifice		ø0.5	ø0.8
Power supply voltage		12 to 24 VDC ±10%, Ripple (p-p) 10% or less (With power supply polarity protection)	
Switch output		NPN open collector 30 V, 80 mA	
Indicator light		ON: When output is ON.	
Current consumption		17 mA or less at 24 VDC	
Operating temperature range		0 to 60°C (With no condensation)	
Port size		M5 x 0.8	
Lead wire Note)	**Grommet type**	Grommet Oilproof heavy-duty vinyl cable 3 cores, ø3.4, Conductor area: 0.2 mm², Insulator O.D.: 1.1 mm	
	Connector type	Heat-resistant vinyl electric wire, 3-wire, Conductor area: 0.31 mm², Insulator O.D.: 1.55 mm	
Standard		RoHS	

Note) For details about wiring, refer to the Operation Manual that can be downloaded from SMC website (http://www.smcworld.com).

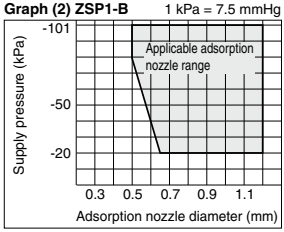
Applicable Adsorption Nozzle Range

Relation between supply pressure and adsorption nozzle diameter is shown in the below graph.

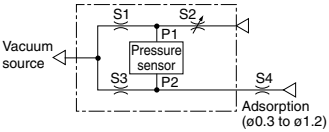
Graph (1) ZSP1-S 1 kPa = 7.5 mmHg



Graph (2) ZSP1-B 1 kPa = 7.5 mmHg



Pneumatic Circuit and Principle

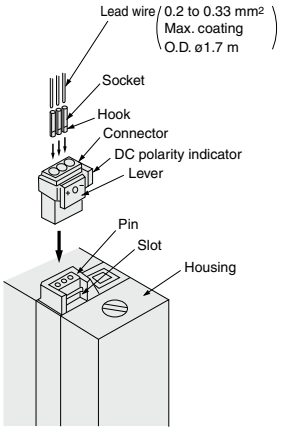


The air pressure forms a bridge circuit inside the unit with a vacuum applied to the circuit, but with the adsorption nozzle "S4" open, adjust needle "S2" so that (P1 ≡ P2). When parts are absorbed by nozzle "S4", the resulting (P2 – P1) differential will be detected by the pressure sensor.

How to Use Connector

1. Attaching and detaching connectors

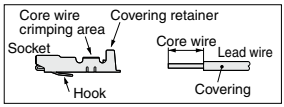
- When assembling the connector to the switch housing, push the connector straight onto the pins until the lever locks into the housing slot.
- When removing the connector from the switch housing, push the lever down to unlock it from the slot and then withdraw the connector straight off of the pin.



2. Crimping of lead wires and sockets

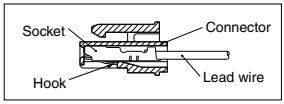
Strip 3.2 to 3.7 mm at the end of hte lead wires, insert the ends of the core wires evenly into the sockets, and then crimp with a crimping tool. When this is done, take care that the coverings of the lead wires do not enter the core wire crimping area.

(Crimping tool: model no. DXT170-75-1)



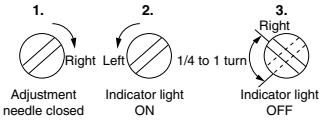
3. Attaching and detaching lead wires with sockets

- Attaching
  Insert the sockets into the square holes of the connector (with +, 0, – indication), and continue to push the sockets all the way in until they lock by hooking into the seats in the connector. (When they are pushed in their hooks open and they are locked automatically.) Then confirm that they are locked by pulling lightly on the lead wires.
- Detaching
  To detach a socket from a connector, pull out the lead wire while pressing the socket's hook with a stick having a thin tip (about 1 mm). If the socket will be used again, first spread the hook outward.

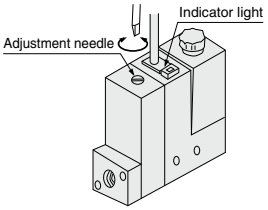


How to Set Adsorption Confirmation Adjustment Needle

1. Supply the vacuum and electrical power source to the unit. Rotate an adjustment needle clockwise until it stops.
2. With the adsorption nozzle away from a workpiece (open), turn the adjustment needle counterclockwise until the indicator light turns on.
3. From the above 2. position, turn the adjustment needle 1/4 to 1 turn clockwise.

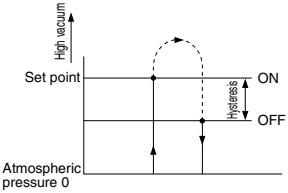


4. Re-adjust the needle so the indicator light turns ON only when the work adsorption is steady.



Hysteresis

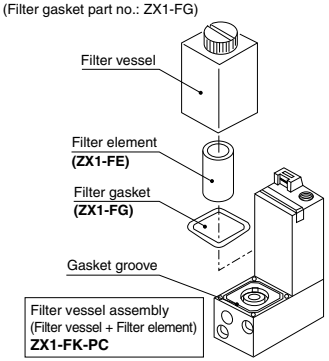
Hysteresis is the pressure difference between the ON pressure and the OFF pressure of the output signal. The set pressure is the pressure selected to switch from OFF to ON condition.



How ro Replace Filter Element

If the filter element becomes clogged, leading to a reduced adsorption force or delayed response time, stop the operation and re-place the element. (Element part number ZX1-FE) Verify that the filter gasket is placed properly in the gasket groove before installing an element.

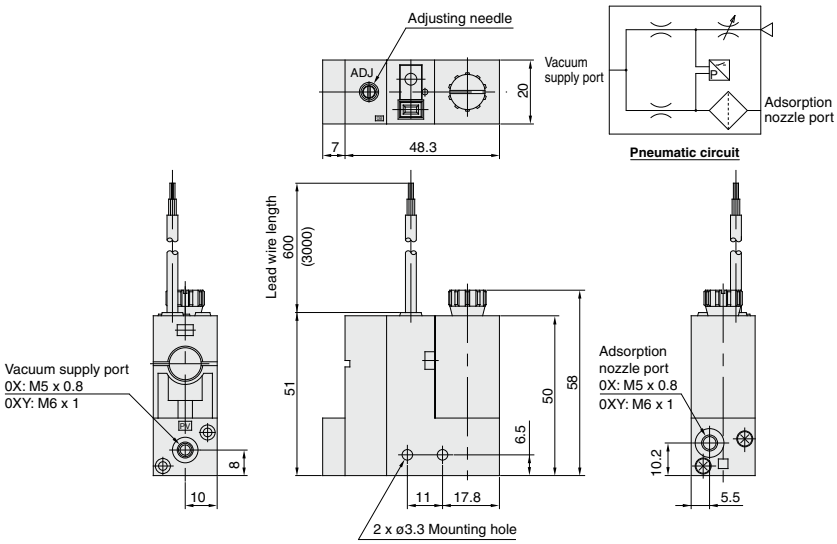
(Filter gasket part no.: ZX1-FG)



Dimensions

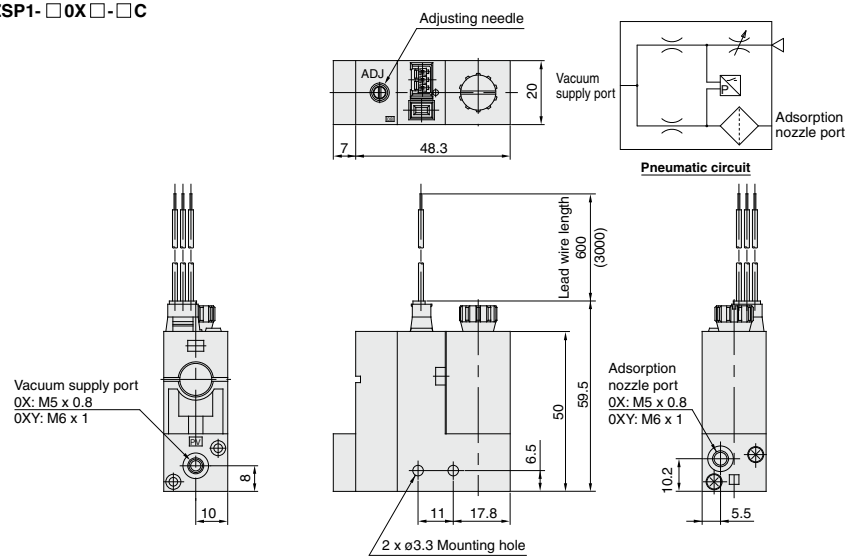
Grommet type:

ZSP1-□0X□-□



Connector type:

ZSP1-□0X□-□C



Vacuum Module

Series ZX

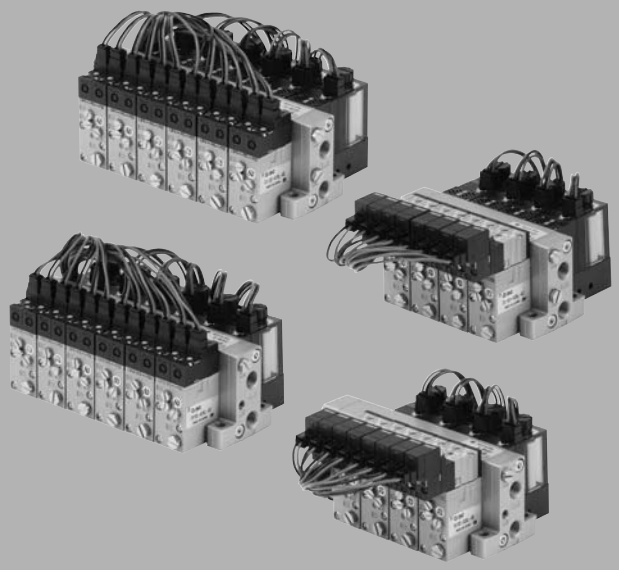
Ejector System/Vacuum Pump System

[Option]

For electronic components and precision components up to 100 g

Modular design

Customized application function through selection of module components.



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Vacuum Pump System

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Made to Order

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Series ZX

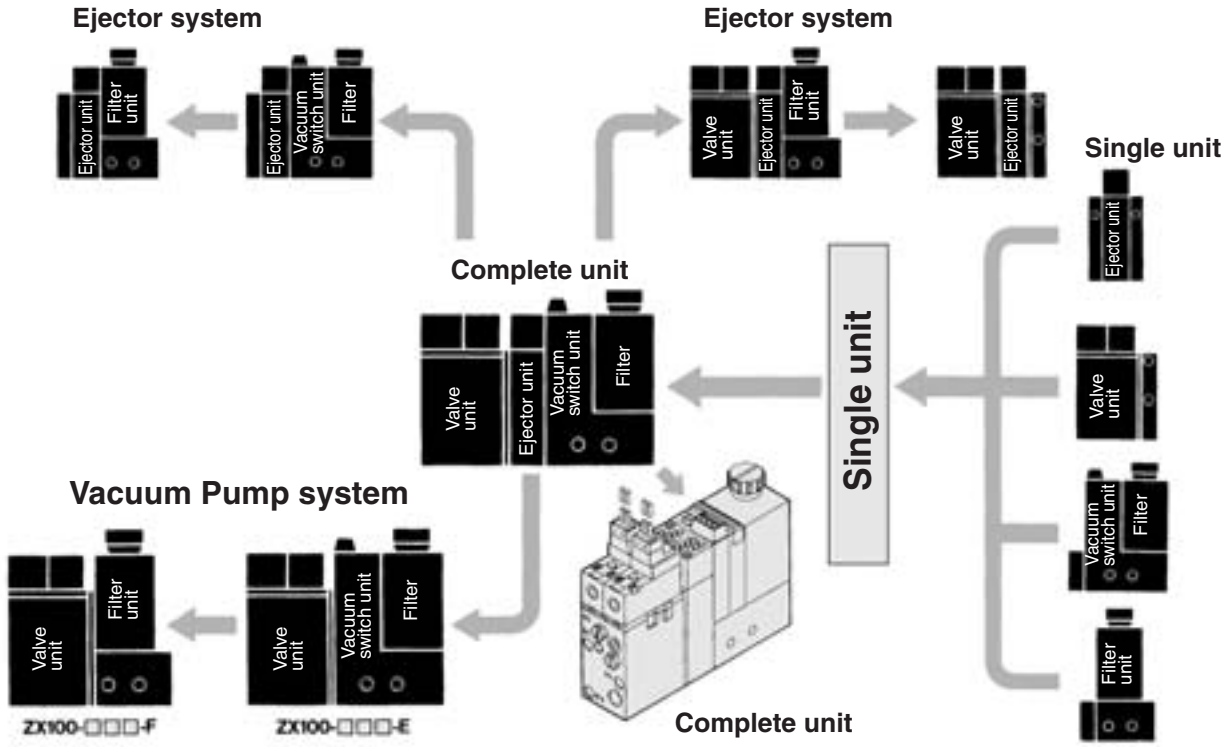
For electronic components and precision components up to 100 g

Modular design

Customized application function through selection of module components.

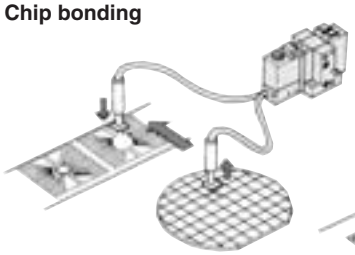
Compact size and lightweight (120 g with complete unit); well suitable for actuator mounting

Ejector nozzle size: ø0.5 to ø1.0 (Suction flow: 5 to 22 ℓ/min (ANR))

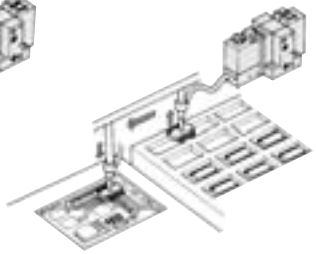


Application Example

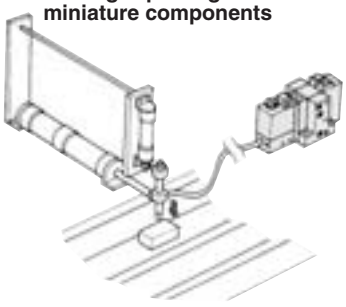
Chip bonding



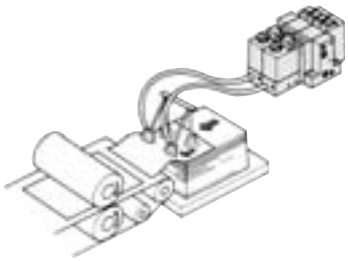
Chip mounting



Picking & placing miniature components



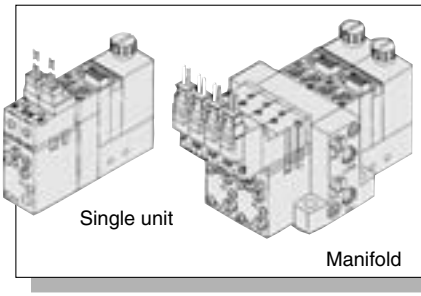
Escorting printed matter

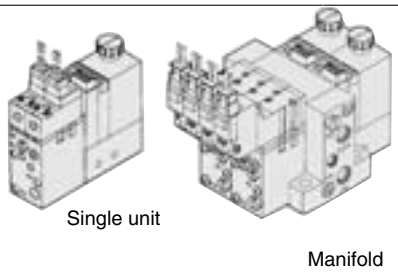


Modular Components Introduction

System		Ejector System			Vacuum Pump System	
Component equipment	Characteristics	P.866 to 901			P.902 to 929	
Ejector unit **Series ZX1** 	Nozzle diameter (mm)	0.5	0.7	1.0	———	
	Max. suction flow (ℓ/min(ANR))	5	10	22		
	Air consumption (ℓ/min(ANR))	13	23	46		
	Maximum vacuum pressure	–84 kPa				
	Exhaust release	Built-in silencer/Manifold exhaust Individual exhaust port: (Rc 1/8)				
Valve unit **ZX1-V□** 	Component equipment	Supply valve/Release valve				
	Function	N.C., N.O.				
	Operation	Solenoid valve/Air operated valve				
	Power supply voltage	3, 5, 6, 12, 24 VDC, 100, 110 VAC (50/60 Hz)				
Vacuum pressure switch unit **Series ZS** 	Series	Vacuum switch	Adsorption confirmation switch		Vacuum switch	Adsorption confirmation switch
	Set pressure range	0 to –101 kPa	–20 kPa to –101 kPa		0 to –101 kPa	–20 kPa to –101 kPa
	Hysteresis	3% or less			0.5 kPa	
	Applicable pad diameter (mm)	2 to 25	0.3 to 1.2		2 to 25	0.3 to 1.2
	Supply voltage	24 VDC			24 VDC	
Suction filter unit **ZX1-F** 	Operating pressure range	Vacuum to 0.5 MPa				
	Filtration	30 μm				
Common specifications	Unit: Air supply port size	M5 (Standard)/M6 (Option)				
	Unit: Vacuum pad connection port size	M5 (Standard)/M6 (Option)				
	Manifold: Air supply port size	Rc 1/8				
	Manifold: Exhaust port size	Rc 1/8				
	Manifold: External pilot port size	M5				
	Manifold: Stations	Max. 8 units				

- Refer to pages 870 to 880 for detailed specifications for each unit.
- Refer to pages 866 and 867 for ejector system unit.
- Refer to page 894 for ejector system manifold.
- Refer to pages 902 and 903 for external vacuum supply system unit.





Made to Order
(Refer to pages 930 to 934 for details.)

- Refer to page 916 for external vacuum supply system manifold.
- Refer to pages 924 to 927 for units for replacement.

Vacuum Module: Ejector System

Series ZX

Note) Refer to "How to Order" for CE compliant products. **[Option]**

How to Order

Components

Ejector unit	Valve unit N.C. type	Vacuum switch unit
Ejector unit	Valve unit N.O. type	Vacuum switch unit
Ejector unit		Vacuum switch unit
Ejector unit		Filter unit

	Ejector unit nozzle dia.	Ejector exhaust	Combination of supply valve and release valve	Pilot valve	Solenoid valve rated voltage	Electrical entry	Light/Surge voltage suppressor	Manual operation	Vacuum switch unit Filter unit	Vacuum switch Electrical entry	PV/V port size	Release flow rate adjusting needle	
ZX1	10	1	K1		5	L	Z		E	C		L	
ZX1	10	1	K3		5	L	Z		E	C			
ZX1	10	1							E	C			
ZX1	10	1							F				

Ejector unit nozzle dia.

05	0.5 mm
07	0.7 mm
10	1.0 mm

Ejector exhaust

1	With silencer
2 (1)	Port exhaust Rc 1/8
3 (2)	Common exhaust (Manifold only)

Note 1) When port exhaust is applied to the manifold, pilot exhaust is done by common exhaust. Thus, the exhaust port on the manifold base should be open while operating.

Note 2) When the product is used for the manifold specification and common exhaust, the exhaust air of the operating ejector releases may enter the vacuum (V) port of the non-operating ejector and be released if there are an operating and non-operating ejector. Select either the built-in silencer or port exhaust for the ejector exhaust method.

Valve unit/Combination of supply valve and release valve
Refer to "Table (1)" on page 867.

Pilot valve

Nil	DC: 1 W (With indicator light: 1.05 W)
	AC
Y *	DC: 0.45 W (With indicator light: 0.5 W)

* Only 24 VDC and 12 VDC are applicable to 0.45 W.

Solenoid valve rated voltage

		CE compliant
1 * Note)	100 VAC 50/60 Hz	—
3 * Note)	110 VAC 50/60 Hz	—
5	24 VDC	●
6	12 VDC	●
V	6 VDC	●
S	5 VDC	●
R	3 VDC	●
Nil	Air operated (K6, K8, J3, J4, D3, D4)	—

Note) CE compliant products are not available for "1" and "3".

* Applicable to plug connector only. (Connector assembly with rectifier is attached.)

Electrical entry

L	L plug connector type	Lead wire length 0.3 m
LN		Without lead wire (Applicable to DC only)
LO		Without connector
M	M plug connector type	Lead wire length 0.3 m
MN		Without lead wire (Applicable to DC only)
MO		Without connector
G	Grommet type	Lead wire length 0.3 m (Applicable to DC only)
H		Lead wire length 0.6 m (Applicable to DC only)
Nil	Air operated	

Note) In the case of "K1" or "J1" (combination of supply and release valves), M type plug connector can not be used.

Vacuum switch electrical entry

Nil	Grommet type	Lead wire length 0.6 m
L		Lead wire length 3 m
C	Connector type	Lead wire length 0.6 m
CL		Lead wire length 3 m
CN		Without connector (Without lead wire)

• Refer to "Table (3)" on page 867 for part number of lead wire with connector.

PV/V port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Release flow rate adjusting needle

Nil	Without lock nut
L	With lock nut

CE compliant

Nil	—
Q	CE compliant

Vacuum switch unit/Filter unit

				CE compliant
Nil	None			●
E	Vacuum switch (For general purpose)(ZSE2)(NPN)		With suction filter	●
E55	Vacuum switch (For general purpose)(ZSE2)(PNP)			●
PS Note)	Adsorption confirmation switch (ZSP1)	Nozzle dia. (ø0.3 to 0.7)		—
PB Note)		Nozzle dia. (ø0.5 to 1.2)		—
F	Only suction filter			● Except air operated parts

Note) CE compliant products are not available for "PS" and "PB".

Vacuum digital pressure switch unit (ZSE3)

D	21	2 outputs/without analog output
	22	2 outputs/with analog output
	23	1 output (with trouble detection)/without analog output
	24	1 output (with trouble detection)/with analog output

Note) Analog output is available only on grommet type.

Manual operation

Nil	Non-locking push type
B	Locking slotted type

Light/Surge voltage suppressor

Nil	None
Z	With light/surge voltage suppressor
S *	With surge voltage suppressor

* S is not available for AC.
DC voltage (with surge voltage suppressor)
If the polarity is incorrect at DC (surge voltage suppressor), diode or switching element may be damaged.

The filter mounted on the product is a simplified one. When used in an environment with a lot of dust, the filter is likely to be clogged quickly. The use with the series ZFA, ZFB and ZFC is recommended.

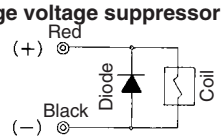
• Refer to "Table (2)" on page 867 for part number of lead wire with connector.
• Refer to page 894 for ordering the manifold.
• Refer to pages 924 and 925 for ordering a unit for replacement.

⚠ Caution

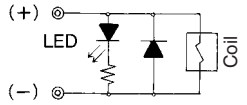
When using the AC type, the DC solenoids are operated via a rectifier. Therefore, when using this type, make sure to combine the connector assembly equipped with a rectifier with the exclusive solenoids. Using other combinations could lead to burned coils or other types of malfunctions.

⚠ Caution

Surge voltage suppressor



Light/Surge voltage suppressor



Using the DC type:
Match the polarity of the connectors according to the ⊕ and ⊖ marks on the connectors. Do not interchange the polarities to prevent the diodes or the switching elements from becoming burned.
If lead wires are pre-connected, the red wire is ⊕ and the black wire is ⊖.

Using the AC type:
The AC type is not equipped with a surge voltage suppressor because the rectifier assembly prevents the generation of surge voltage.

Made to Order
(Refer to pages 930 to 934 for details.)

SMC

Table (1) Valve Unit/Combination of Supply Valve and Release Valve (Refer to page 868 for detailed specifications.)

Components		Symbol	Supply valve					Release valve					Mass (g)
			Solenoid valve		Air operated		None	Solenoid valve		Air operated	External release	None	
Supply valve	Release valve		N.C. (VJ114)	N.O. (VJ324)	N.C. (ZX1A)	N.O. (VJA324)		N.C. (VJ114)	N.C. (VJ314)	N.C. (VJA314)	ZX1A		
Solenoid (N.C.)	Solenoid (N.C.)	**K1**	●	—	—	—	—	●	—	—	—	—	82
Solenoid (N.O.)	Solenoid (N.C.)	**K3**	—	●	—	—	—	—	●	—	—	—	132
Air operated (N.C.)	External release	**K6**	—	—	●	—	—	—	—	—	●	—	58
Air operated (N.O.)	Air operated (N.C.)	**K8**	—	—	—	●	—	—	—	●	—	—	132
Solenoid (N.C.)	None	**J1**	●	—	—	—	—	—	—	—	—	●	77
Solenoid (N.O.)	None	**J2**	—	●	—	—	—	—	—	—	—	●	100
—		**Nil**	Without valve module										

• Air operated valve: Controlled by external 3 port valve.
• External release: Directly released by external 2 port valve.

Table (2) Valve Unit/Valve Plug Connector Assembly

Connector assembly part no.
(For DC)
VJ10-20-4A-6
(For 100 VAC)
VJ10-36-1A-6
(For 110 VAC)
VJ10-36-3A-6

Lead wire length

Nil	0.3 m (Standard)
6	0.6 m
10	1 m
15	1.5 m
20	2 m
25	2.5 m
30	3 m

How to order
If ordering vacuum module with 600 mm or the longer lead wire, specify both vacuum module and connector assembly part numbers.
Ordering example)
ZX1051-K15LOZ-EC(-Q) ··· 1 pc.
∗VJ10-20-4A-6 ····· 2 pcs.

Table (3) Vacuum Switch/ Lead Wire with Connector

For ZSE2
For ZSP1 **ZS-10-5A-□**

For ZSE3 **ZS-20-5A-□**

Note) If ordering a vacuum switch with 3 m lead wire, specify both the vacuum unit switch and the 3 m lead wire with connector part numbers.

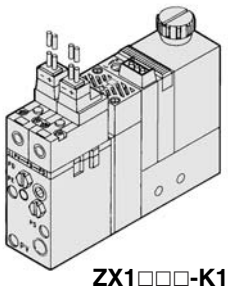
Lead wire length

Nil	0.6 m
30	3 m
50	5 m

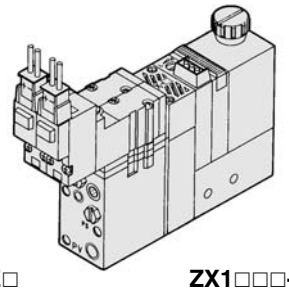
Ordering example)
ZX1051-K15LO- ECN(-Q) ··· 1 pc.
∗VJ10-20-4A-6 ····· 2 pcs.
∗ZS-10-5A-50 ····· 1 pc.
The asterisk (∗) denotes the symbol for assembly.

Ejector System/Recommended Model (The models below will have shorter deliveries.)

Nozzle diameter (mm)	Model	Ejector unit exhaust type	Combination		Solenoid valve rated voltage	Lead wire electrical entry	Light/Surge voltage suppressor	Vacuum switch unit	Vacuum switch electrical entry
			Supply valve (Pilot valve)	Release valve (Direct operated)					
0.5	**ZX1051-K15LZ-EC**	With silencer	N.C. (VJ114)	N.C. (VJ114)	24 VDC	Plug connector type	With light/surge voltage supressor	General vacuum switch (ZSE2)	Connector type
	ZX1051-K35MZ-EC		N.O. (VJ324M)	N.C. (VJ314)					
0.7	**ZX1071-K15LZ-EC**		N.C. (VJ114)	N.C. (VJ114)					
	ZX1071-K35MZ-EC		N.O. (VJ324M)	N.C. (VJ314)					
1.0	**ZX1101-K15LZ-EC**		N.C. (VJ114)	N.C. (VJ114)					
	ZX1101-K35MZ-EC		N.O. (VJ324M)	N.C. (VJ314)					



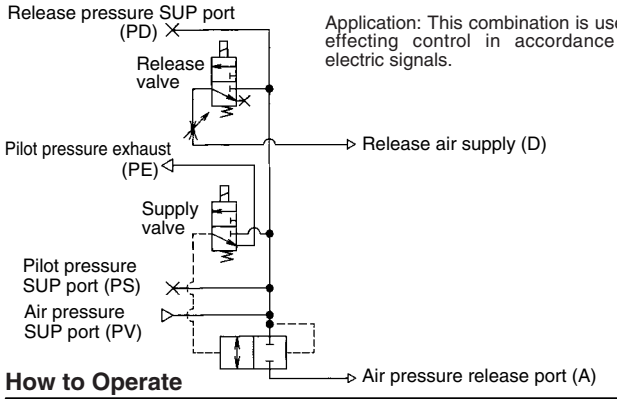
ZX1□□□-K15LZ-E□



ZX1□□□-K35MZ-E□

Ejector System/Combination of Supply Valve and Release Valve

Combination Symbol: K1

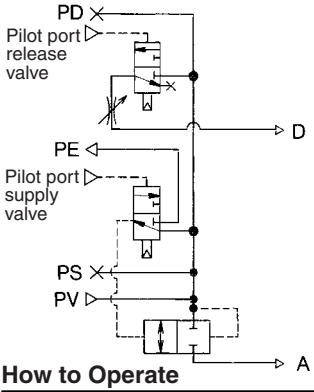


Application: This combination is used for effecting control in accordance with electric signals.

How to Operate

Valve / Condition	Supply valve (N.C.)	Release valve (N.C.)
	Solenoid valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K8

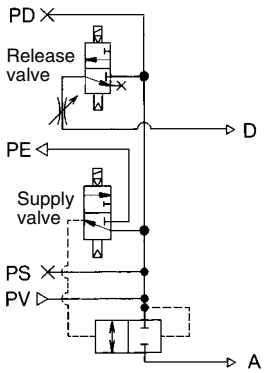


Application: This combination is used for effecting control in accordance with air signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve (N.O.)	Release valve (N.C.)
	Air operated valve	Air operated valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: K3

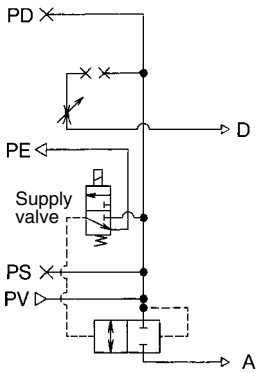


Application: This combination is used for effecting control in accordance with electric signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve (N.O.)	Release valve (N.C.)
	Solenoid valve	Solenoid valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: J1

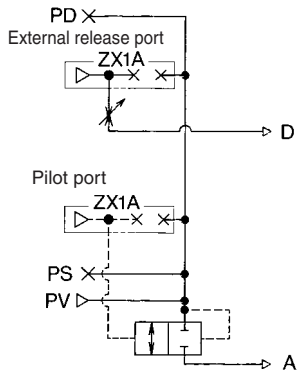


Application: This combination is used for effecting control in accordance with electric signals. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This combination is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve (N.C.)	Release valve
	Solenoid valve	None
1. Work adsorption	ON	——
2. Vacuum release	OFF	——
3. Operation stop	OFF	——

Combination Symbol: K6

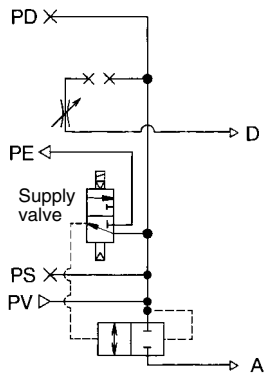


Application: This combination is used for effecting control in accordance with air signals.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 3 port valve	External 2 port valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: J2

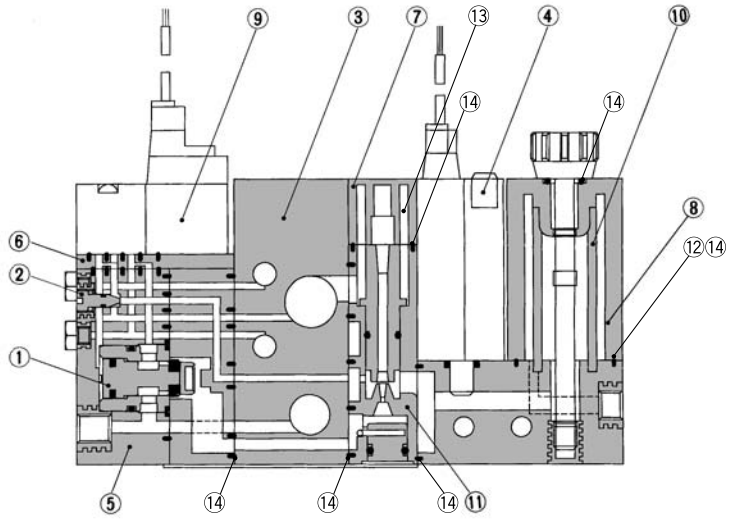


Application: This combination is used for effecting control in accordance with electric signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This type is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve (N.O.)	Release valve
	Solenoid valve	None
1. Work adsorption	OFF	——
2. Vacuum release	ON	——
3. Operation stop	OFF	——

Ejector System/Construction



Component Parts

No.	Description	Material	Note
1	**Poppet valve assembly**	—	ZX1-PV-0
2	**Release flow rate adjustment needle**	Stainless steel	ZX1-NA
3	**Manifold base**	Aluminum	
4	**Vacuum switch**	—	ZSE2, ZSP1, ZSE3
5	**Valve unit**	—	ZX1-VA□□□□□□-D-□
6	**Interface plate**	—	(PV↔PS↔PD)
7	**Silencer case**	—	
8 Note)	**Filter case**	Polycarbonate	

Replacement Parts

No.	Description	Material	Part no.
9	**Pilot valve Air operated**	—	Refer to "Table (1)","(2)","(3)".
10	**Filter element**	PVF	ZX1-FE
11	**Ejector assembly**	—	Refer to "Table (4)".
12	**Gasket**	—	ZX1-FG
13	**Silencer element**	—	ZX1-SAE
14	**Seal set**	—	ZX1-PK
(7,13)	**Silencer assembly**	—	ZX1-HS2-□ (□: Nozzle diameter)

Note) Caution when handling filter case
1) The case is made of polycarbonate. Therefore, do not use with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, watersoluble cutting oil (alkalinic), etc.
2) Do not expose it to direct sunlight.

Table (1) How to Order Pilot Valves

No.	Components		Model	Combination of supply and release valve
	Supply valve	Release valve		
①	Solenoid valve N.C. (VJ114)	Solenoid valve N.C. (VJ114)	ZX1-VJ114-□□□□	K1, J1
②	Solenoid valve N.O. (VJ324)	Solenoid valve N.C. (VJ314)	ZX1-VJ3$\frac{1}{2}$4□-□□□□	K3, J2
③	Air operated N.O. (VJA324)	Air operated N.C. (VJA314)	ZX1-VJA3$\frac{1}{2}$4	K8
④	Air operated N.C. (ZX1A)		ZX1A-□	K6

Table (2) How to Order Solenoid Valves

ZX1−VJ114 □ − 5 L Z □

ZX1−VJ3 2 4 □ □ − 5 L Z □

Type of actuation

1	N.C. (Normally closed)
2	N.O. (Normally open)

Body option

Nil	Pilot valve Individual exhaust
M	Common exhaust for main and pilot valves

Note) In the case of N.C. type, indicate no symbol. (Individual exhaust for Pilot valve)

Note) Compatible with ZX1-VJ324M-□ and ZX1-VJ314-□ only.

Pilot valve

Nil	DC: 1 W (With indicator light: 1.05 W)
	AC
Y*	DC: 0.45 W (With indicator light: 0.5 W)

* Only 24 VDC and 12 VDC are applicable to 0.45 W.

Note) Screw length of VJ100 and VJ300 for series ZX is different from that of the standard model.
<Screw length> VJ100–M1.7 x 15
VJ300–M1.7 x 22

Rated voltage

1 *	100 VAC
3 *	110 VAC
5	24 VDC
6	12 VDC
V	6 VDC
S	5 VDC
R	3 VDC

* Applicable to plug connector only.

Manual override

Nil	Non-locking push type
B	Locking slotted type

Light/Surge voltage suppressor

Nil	Without light/surge voltage suppressor
S	With surge voltage suppressor
Z	With light/surge voltage suppressor

Electrical entry

L	Connector (0.3 m)
LN	Connector (w/o lead wire)
LO	Without connector
M	Connector (0.3 m)
MN	Connector (w/o lead wire)
MO	Without connector
G	Grommet (0.3 m)
H	Grommet (0.6 m)

Note) In the case of "ZX1-VJ114", M, MN and MO cannot be used.

Table (3) How to Order Air Operated Valves

ZX1A − M3

Port size

M3	M3 x 0.5	Pilot port/ External release port
M5	M5 x 0.8	

Table (4) How to Order Ejector Assembly

ZX1−W D 05 1

Assembly no.

Ejector unit nozzle dia.

05	0.5 mm
07	0.7 mm
10	1.0 mm

Ejector type (Exhaust type)

1	With silencer
2	Port exhaust
3	Common exhaust

* **An adapter should be attached to the assembly to be used as a unit. PV port and V port can be connected.**

Ejector assembly
- **Combination/ ZX1-WD□**
- **Used as a unit by attaching an adapter/ ZX1-W□**

⚠ Caution

Turning the vacuum release flow volume adjustment needle clockwise reduces the vacuum release flow volume; the needle valve is fully closed when the needle stops turning. Turning the needle 2 full turns counterclockwise from the fully closed position renders the needle valve fully open. The needle will fall out if it is turned more than 4 full turns.
In order to prevent the needle from loosening and falling out, the release flow volume adjustment needle with lock nut is also available.

Ejector Unit

Specifications

Unit no.	ZX1-W05$^{1}_{2}$	ZX1-W07$^{1}_{2}$	ZX1-W10$^{1}_{2}$
Nozzle dia. (mm)	0.5	0.7	1.0
Max. suction flow (ℓ/min (ANR))	5	10	22
Air consumption (ℓ/min (ANR))	13	23	46
Maximum vacuum pressure	–84 kPa		
Maximum operating pressure	0.7 MPa		
Supply pressure range	0.2 MPa to 0.55 MPa		
Standard supply pressure	0.45 MPa		
Operating temperature range	5 to 50°C		
Ejector exhaust type *	Code ①	Built-in silencer····· For single unit and manifold	
	Code ②	Individual exhaust····· For single unit and manifold	
Mass	Built-in silencer: 35 g/Port exhaust: 45 g		
Standard accessory	Bracket B (ZX1-OBB)		

* Codes ① and ② are corresponding to the suffixes in "How to Order" to indicate the ejector exhaust method.

How to Order

ZX1 — W 05 1 □

Nozzle diameter

05	0.5 mm
07	0.7 mm
10	1.0 mm

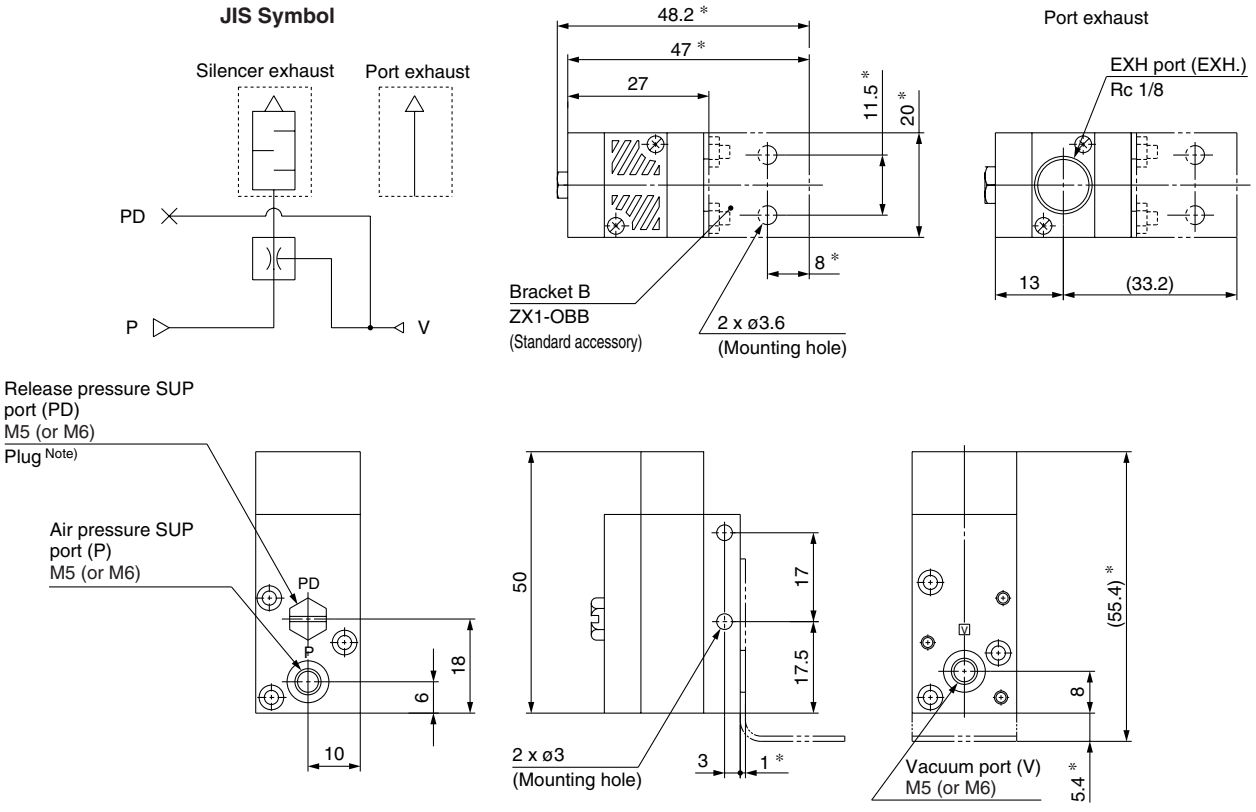
PV, V port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Ejector exhaust method

1	Silencer
2	Individual exhaust Rc 1/8

Dimensions: ZX1-W□□$^{1}_{2}$



Note 1) Remove the plug at external release. Note 2) Dimensions *: For mounting bracket B.

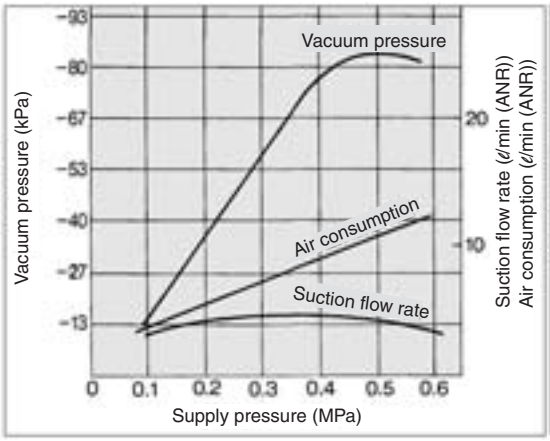
SMC

Flow Characteristics/Exhaust Characteristics

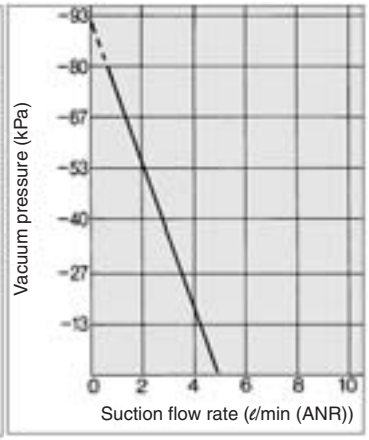
[At 0.45 MPa]

ZX1-W05

Exhaust Characteristics

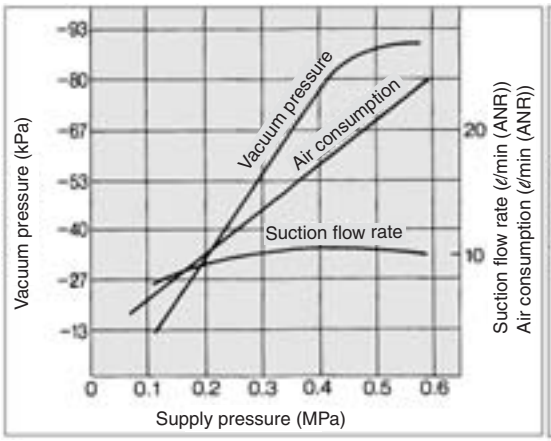


Flow Characteristics

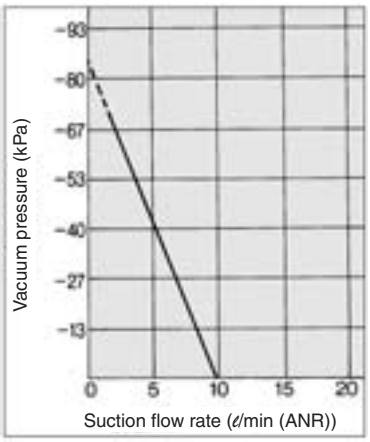


ZX1-W07

Exhaust Characteristics

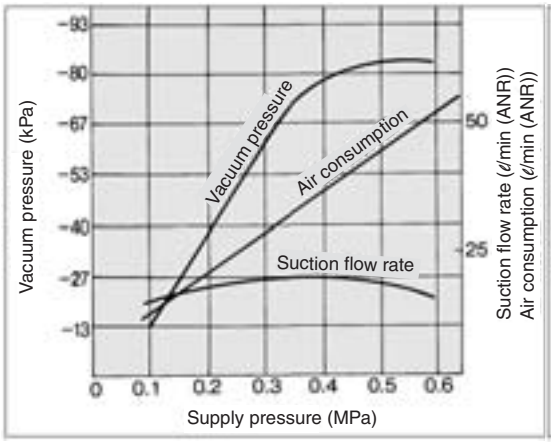


Flow Characteristics

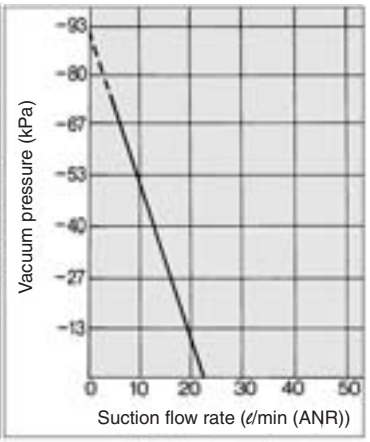


ZX1-W10

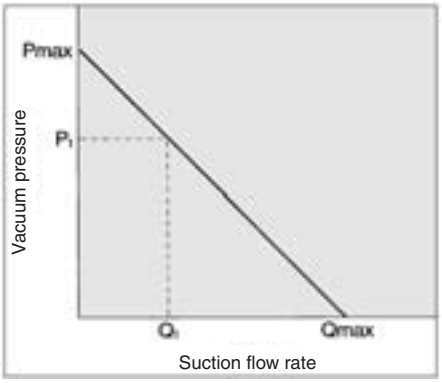
Exhaust Characteristics



Flow Characteristics



How to Read Flow Characteristics Graph



Flow characteristics are expressed in ejector vacuum pressure and suction flow. If suction flow rate changes, a change in vacuum pressure will also be expressed. Normally this relationship is expressed in ejector standard use.

In graph, Pmax. is max. vacuum pressure and Qmax is max. suction flow. The valves are specified according to catalog use. Changes in vacuum pressure are expressed in the below order.

1. When ejector suction port is covered and made airtight, suction flow becomes 0 and vacuum pressure is at maximum value (Pmax).
2. When suction port is opened gradually, air can flow through, (air leakage), suction flow increases, but vacuum pressure decreases. (condition P_1 and Q_1)
3. When suction port is opened further, suction flow moves to maximum value (Qmax), but vacuum pressure is near 0. (atmospheric pressure).
   When vacuum port (vacuum piping) has no leakage, vacuum pressure becomes maximum, and vacuum pressure decreases as leakage increases. When leakage value is the same as max. suction flow, vacuum pressure is near 0.
   When ventirative or leaky work must be adsorbed, please note that vacuum pressure will not be high.

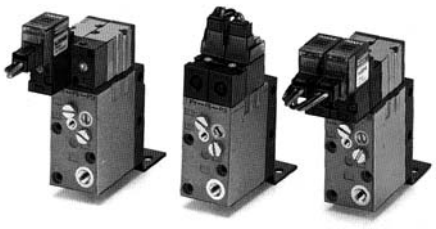
⚠ Precautions

Be sure to read before handling. Refer to front matters 38 and 39 for Safety Instructions and pages 844 to 846 for Vacuum Equipment Precautions.

⚠ Caution

Refer to the vacuum equipment model selection on pages 825 to 843 for the selection and sizing of Series ZX.

Valve Unit: ZX1-VA



Model/Specifications

Unit no.	ZX1-VA□□□□□-□(-Q)							
Components	Supply valve				Release valve			
Operation	Pilot operated				Direct operated			
	Solenoid valve		Air operated		Solenoid valve		External release	Air operated
	N.C. (VJ114)	N.O. (VJ324M)	N.C. (ZX1A)	N.O. (VJA324)	N.C. (VJ314)	N.C. (VJ114)	(ZX1A)	N.C. (VJA314)
Cv factor	0.17 Main valve				0.08	0.008	—	
Operating pressure range	0.3 to 0.6 MPa							
Max.operating frequency	5 Hz							
Operating temperature range	5 to 50°C							
Interface plate symbol	PV◄►PS◄►PD							
Standard accessory	Bracket C(ZX1-OBC)							

Solenoid Valve Specifications

	VJ114	VJ314, VJ324
Rated voltage	24, 12, 6, 5, 3 VDC/100, 110 VAC* (50/60 Hz)	
Electrical entry	L plug connector, grommet	L plug connector, M plug connector, grommet
Light/Surge voltage suppressor	With or Without	
Manual operation	Non-locking push type/Locking slotted type	

* Applicable to plug connector only. Connector assembly with rectifier is attached.

Model/Solenoid Valve

Model		Supply valve			
		Solenoid valve N.C. (VJ114)	Solenoid valve N.O. (VJ324M)	Air operated N.C. (ZX1A)	None
Release valve	Solenoid valve N.C. (VJ114)	● K1 [82]	—	● K5 [73]	● D1 [77]
	Solenoid valve N.C. (VJ314)	—	● K3 [132]	—	● D2 [100]
	External release (ZX1A)	● K2 [73]	—	● K6 [58]	● D3 [41]
	Air operated N.C. (VJA314)	—	● K4 [119]	—	● D2 [100]
	None	● J1 [77]	● J2 [100]	● J3 [41]	—

[ ]: Mass (g)

How to Order /Refer to page 866 for details.

ZX1 − V A K1 □ 5 L Z □ □ − □ − □

System

A	Ejector system
B	External vacuum supply

* Refer to page 906 for the specifications of ZX1-VB□□.

Combination of supply valve and release valve

Pilot valve

Rated voltage

Electrical entry

Light/Surge voltage suppressor

Manual override

PV/V port size

Release flow rate adjusting needle

CE compliant

Connector Assembly for 100 VAC

Connector assembly with rectifier attached.

Connector Assembly with Rectifier Part No.

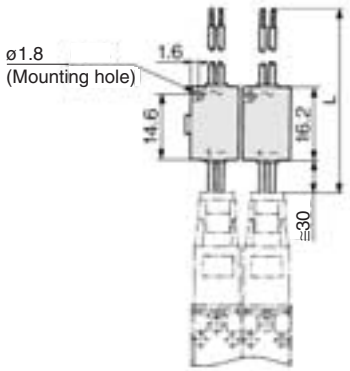
VJ10 − 36 − □ A − □

Rated voltage

Symbol	Rated voltage	Lead wire color
1	100 VAC 50/60 Hz	Blue (2 pcs.)
3	110 VAC 50/60 Hz (115 VAC 60 Hz)	Gray (2 pcs.)

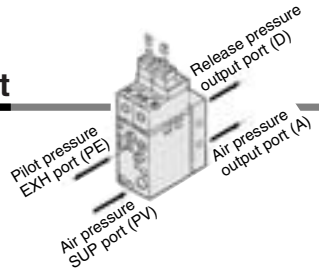
Lead wire length

Symbol	L mm
Nil	300
6	600
10	1000
15	1500
20	2000
25	2500
30	3000

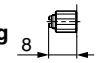


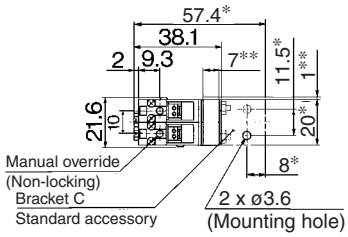
Valve Unit

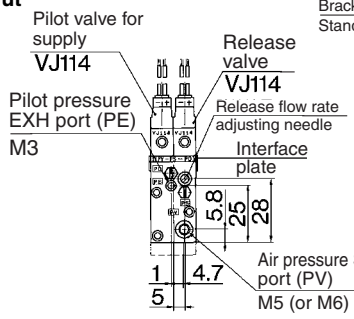
Normally closed

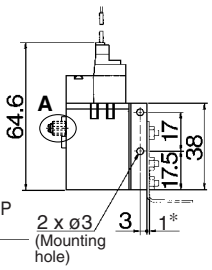


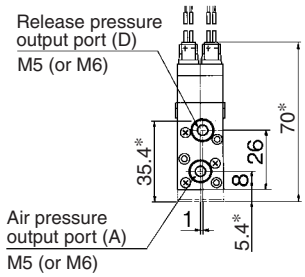
A: Release flow rate adjusting needle with lock nut

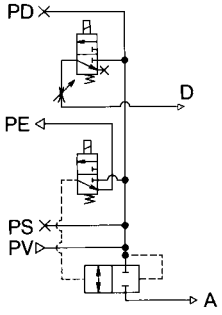






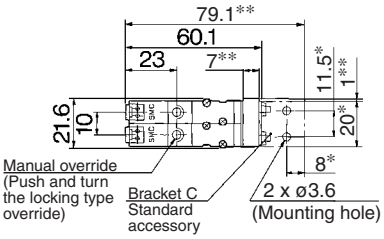


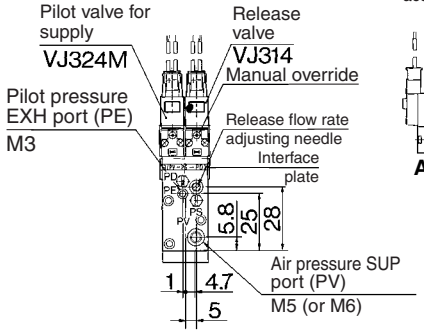


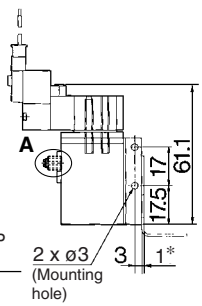


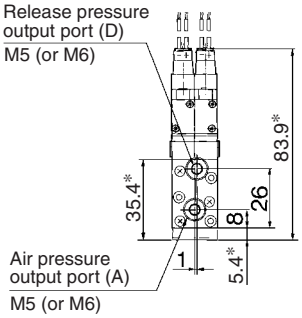
Circuit diagram

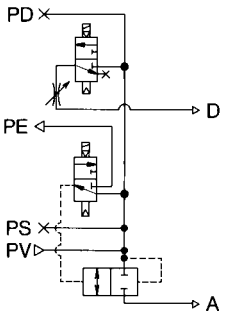
Normally open











Circuit diagram

Note) Dimensions ∗: For mounting bracket C ∗∗: For mounting spacer.

Suction Filter Unit: ZX1-F

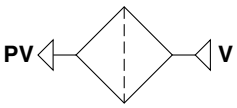
Specifications

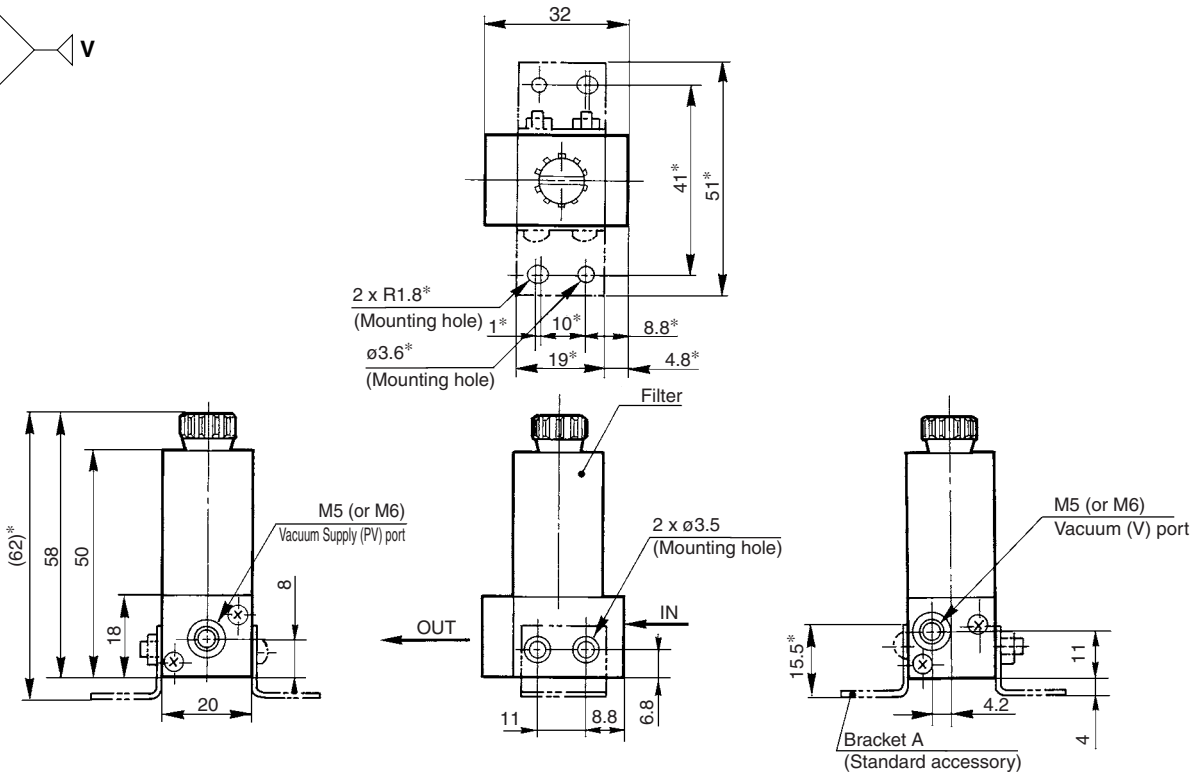
Unit no.	ZX1-F
Operating pressure range	—100 to 500kPa
Operating temperature range	5 to 50°C
Filtration efficiency	30 μm
Element	PVF
Mass	35 g
Standard accessory	Bracket A (ZX1-OBA)

Note) If not operated within the specified range of pressure and temperature, trouble may result.

Filter

JIS Symbol





Note) Dimensions ∗: For A mounting bracket.

Filter case

⚠ Caution

1. **The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water-soluble cutting oil (alkalinic), etc.**
2. **Do not expose it to direct sunlight.**

About this product

The filter mounted on the product is a simplified one. When used in an environment with a lot of dust, the filter is likely to be clogged quickly. Select a large-volume filter such as Series ZFA.

Vacuum Pressure Switch Unit/Vacuum Pressure Switch: ZSE2-0X

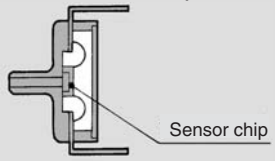
Quick response: 10 ms

Compact size: 39H x 20W x 15D (except the connecting portion of the standard type)

Improved wiring: connector type

Uses a carrier diffusion semiconductor pressure sensor

Pressure detector
(A carrier diffusion semiconductor pressure sensor is used.)



Vacuum Pressure Switch

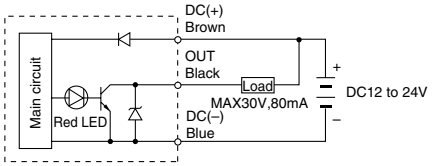
Unit no.	ZSE2-0X
Fluid	Air
Set pressure range	0 to –101 kPa
Hysteresis	3% Full span or less
Repeatability	±1% Full span or less
Temperature characteristics	±3% Full span or less
Voltage	12 to 24 VDC (Ripple ±10% or less)
Port size	M5 x 0.8, M6 x 1 (Option)
Mass	50 g
Output	Open collector 30 V, 80 mA
Indicator light	Light at ON state
Current consumption	17 mA or less (24 VDC, at ON state)
Operating temperature range	0 to 60°C
Max. operating pressure	0.5 MPa *

* When using ejector system, instantaneous pressure up to 0.5 MPa will not damage the switch.
Note) If not operated within the specified range of pressure of temperature, trouble may result.

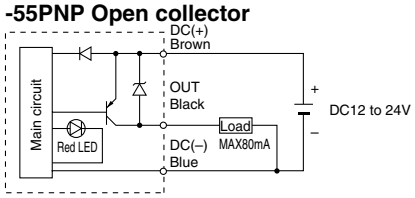
Wiring

ZSE2 connection

-15NPN Open collector



-55PNP Open collector



How to Order

ZSE2 – 0X □ – 15 □

PV, V port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Output specifications

15	NPN Open collector 30 V 80 mA
55	PNP Open collector 30 V 80 mA

Electrical entry

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

• Filter case

⚠Caution

1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water-soluble cutting oil (alkalinic), etc.

2. Do not expose it to direct sunlight.

• Vacuum pressure setting

⚠Caution

Observe the following precautions when setting the vacuum pressure.

Lightly turn the screwdriver with your fingertips.

To prevent damage to the trimmer groove, do not use a screwdriver that has a large grip or a tip that does not fit in the trimmer groove.

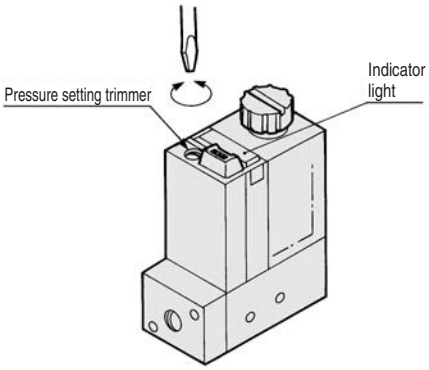
The filter mounted on the product is a simplified one. When used in an environment with a lot of dust, the filter on the unit is likely to be clogged quickly. Use with the ZFA, ZFB and ZFC series is recommended.

Refer to the pressure switch ZSE2 Series catalog for the detailed specifications of pressure switches.

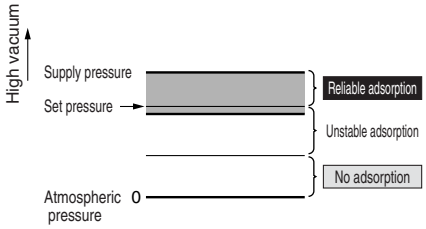
How to Set Vacuum Pressure

ZSE2

• Pressure setting trimmer selects the ON pressure. Clockwise rotation increases high vacuum set point.



• When using the switch to confirm correct adsorption, the set pressure should be as low as possible. If setting the pressure lower than that, switch becomes ON in case when adsorption is not complete. If setting the pressure higher than that, switch does not become ON though it is absorbing workpieces properly.

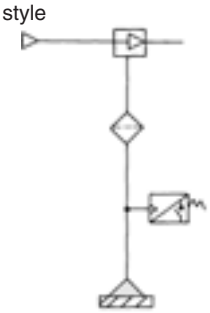


Vacuum Pressure Switch Unit/Vacuum Pressure Switch: ZSE2-0X

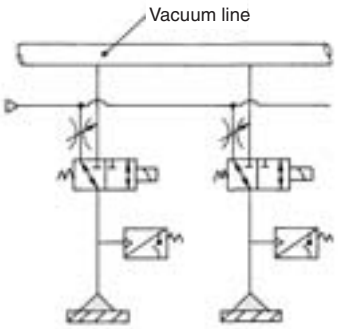
Guidelines for Use of Vacuum Pressure Switch Unit

System circuit for work adsorption

Ejector style



External vacuum supply style



Set pressure

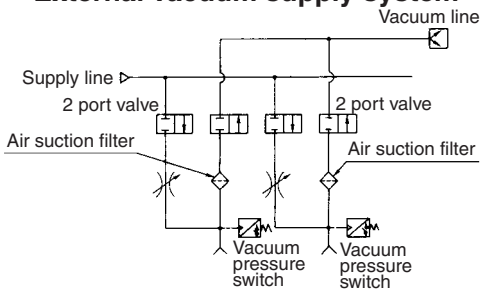
To use for picking verification, set a vacuum pressure that can pick the workpiece without fail.

Using a small diameter picking nozzle

If the nozzle diameter is approximately 1 mm, the adsorption confirmation with ZSE2/ZSE3 may not be possible since the pressure difference between ON and OFF becomes smaller. At times like this, consider using an adsorption confirmation switch, ZSP1 (page 879).

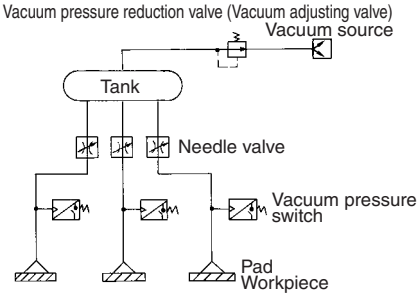
Note) Note that the performance of ejectors and pumps influence the conditions.

External vacuum supply system



Using multiple pressure switches with a single vacuum source

If a single vacuum source is divided so that vacuum switches can be used on individual lines, the vacuum pressure might not come within the values set with the switches because the pressure of the vacuum source fluctuates depending on the number of picks and non-picks. Especially, because pressure fluctuation exerts a great influence when picking with a small diameter nozzle, the countermeasures described below must be provided.

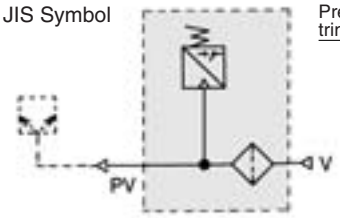


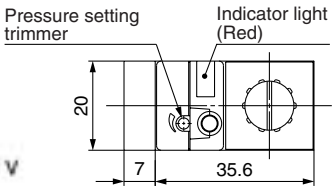
- Adjust the needle valve to reduce the pressure fluctuation between picking and non-picking.
- Stabilize the source pressure by providing a tank and a vacuum regulator.
- Provide a vacuum switch valve to individual lines. Thus, in case of an error, each valve can be turned OFF to minimize the influences on other pads.

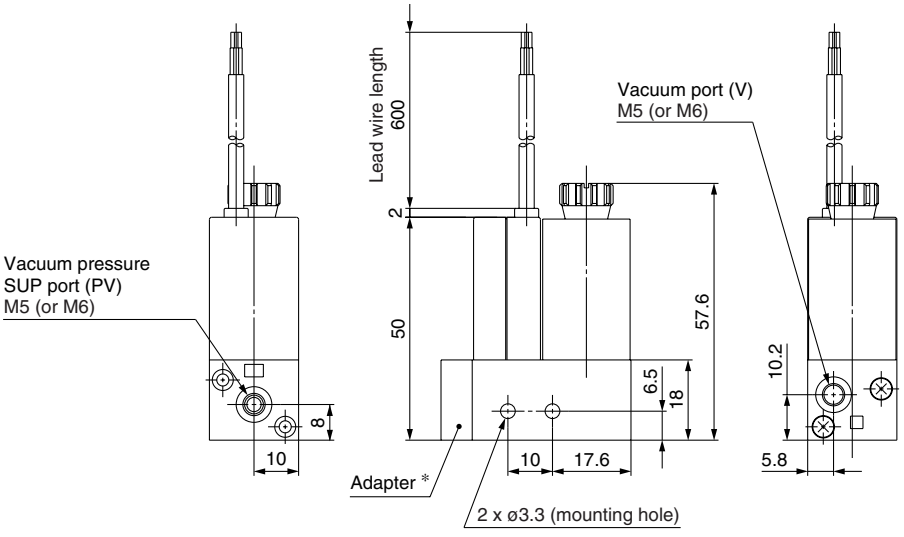
Vacuum Pressure Switch: ZSE2-0X-$\frac{15}{55}$

Grommet: ZSE2-0X-$\frac{15}{55}$

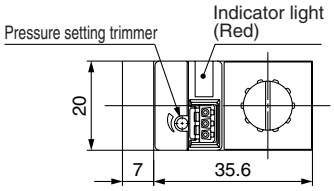
JIS Symbol

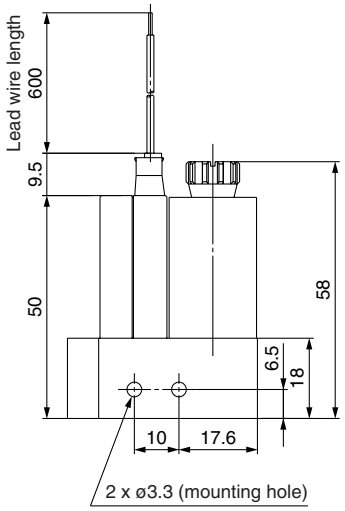






Connector: ZSE2-0X-$\frac{15}{55}$C





Vacuum Pressure Switch Unit/Vacuum Pressure Switch: ZSE3-0X

Built-in failure prediction output function

If the attainable amount of vacuum reduces due to a decrease in performance caused by clogging of the silencer of the vacuum system (ejectors), cracked pads, or the leakage of the vacuum pipes, this function quickly detects the abnormal condition and outputs a signal to halt the system.

Two independent pressure settings are possible

This feature is well suited for applications that require 2 separate pressure outputs due to a change in the vacuum suction pad diameters, or for applications that require 2 pressure verifications to effect line changes in the positive pressure line.

Comprehensive self diagnosis function

- Overcurrent detection function
- Overvoltage detection function
- Data error

Data saving function

Even if the power is cut off, the settings are stored for 100,000 hours (approximately 11 years) in the exclusive IC (EEPROM).

• Filter case

⚠Caution

1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water-soluble cutting oil (alkalinic), etc.

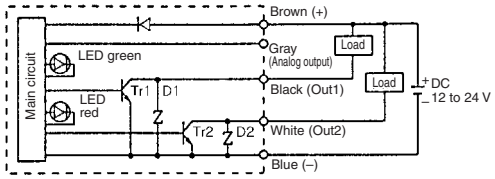
2. Do not expose it to direct sunlight.

Vacuum Pressure Switch

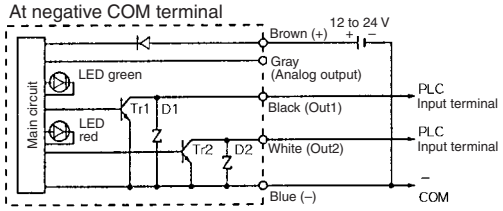
Unit no.		ZSE3-0X
Fluid		Air
Set pressure range		0 to –101 kPa
Hysteresis	Hysteresis mode	Variable (Can be changed from 0)
	Window comparator mode	Fixed (3 digits)
Accuracy		±1% Full span or less
Operating voltage		12 to 24 VDC (Ripple ±10% or less)
Port size		M5 x 0.8, M6 x 1 (Option)
Mass		50 g
Indicator light		Light at ON state
Current consumption		25 mA or less
Operating temperature range		0 to 60°C
Max. operating pressure		0.5 MPa

Wiring

Wiring example
General connection methed



Connection with PLC
At negative COM terminal



How to Order

ZSE3 – 0X □ – 21 □

PV, V port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Output specifications

21	NPN open collector, double output Without analog output
22	NPN open collector, double output With analog output
23	NPN open collector 1 output/Trouble detection/ Without analog output
24	NPN open collector 1 output/Trouble detection/ With analog output

Wiring specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

Note) Analog output is available only for grommet type.

How to Set Vacuum Pressure

Refer to Best Pneumatics No. 6.

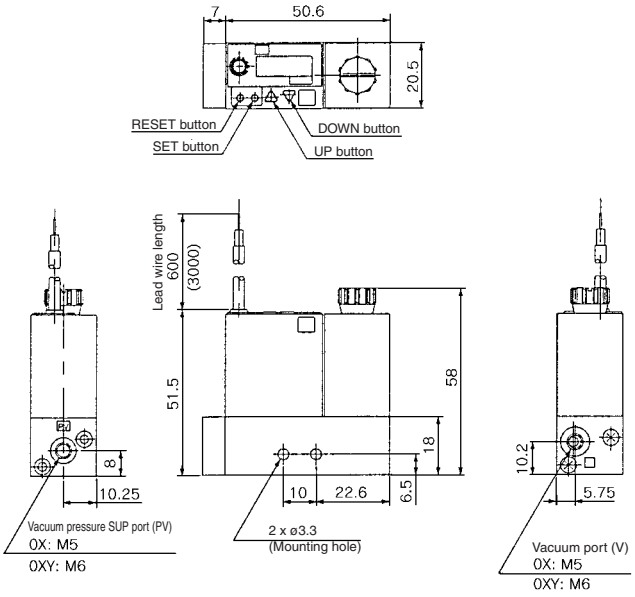
Guidelines for Use of Vacuum Pressure Switch Unit

Refer to page 876.

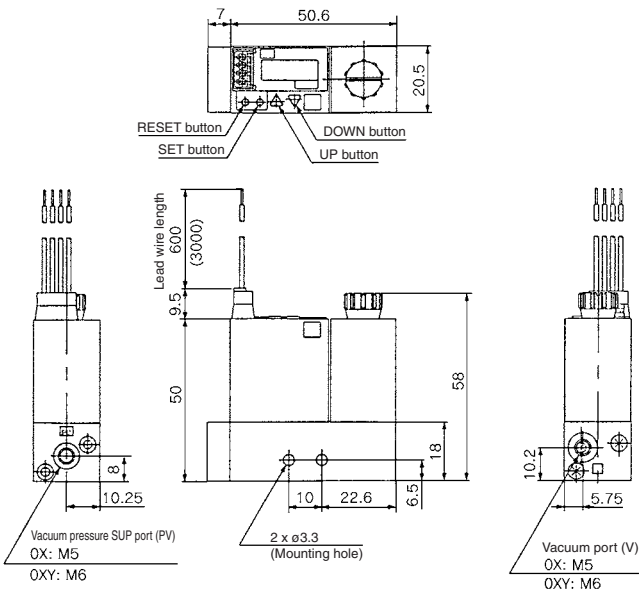
Vacuum Pressure Switch Unit/Vacuum Pressure Switch: ZSE3-0X

Vacuum Pressure Switch/ZSE3-0X□-21, 22, 23, 24

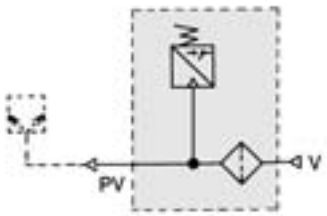
Grommet: ZSE3-0X□-□



Connector: ZSE3-0X□-□C

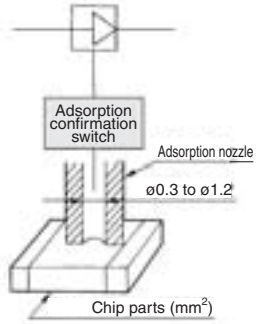


JIS Symbol



Vacuum Pressure Switch Unit/Adsorption Confirmation Switch: ZSP1-$^{S}_{B}$

Small diameter nozzle/ø0.3 to ø1.2



With suction filter

Improved wiring: connector type

Uses a carrier diffusion semiconductor pressure sensor

• Filter case

⚠Caution

1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water-soluble cutting oil (alkalinic), etc.
2. Do not expose it to direct sunlight.

• Other caution

⚠Caution

It might not be possible to successfully pick a workpiece if a picking nozzle or a picking pad that is out of the applicable range is used.

The filter mounted on the product is a simplified one. When used in an environment with a lot of dust, the filter on the unit is likely to be clogged quickly. Use with the ZFA, ZFB and ZFC series is recommended.

Adsorption Confirmation Switch Specifications

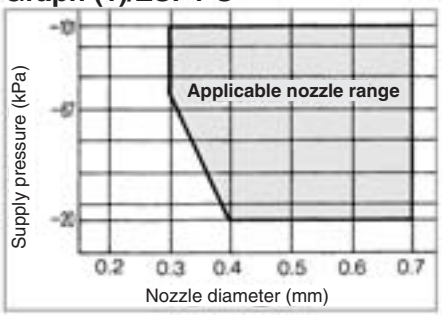
Unit no.	ZSP1-S	ZSP1-B
Fluid	Air	
Operating pressure range	–20 kPa to –101 kPa	
Applicable adsorption nozzle dia.	0.3 to 0.7 mm (Refer to Graph (1).)	0.5 to 1.2 mm (Refer to Graph (2).)
Hysteresis	0.5 kPa	
Internal orifice	ø0.5	ø0.8
Mass	62 g	
Voltage	12 to 24 VDC (Ripple ±10% or less)	
Output	NPN Open collector 30 V 80 mA	
Indicator light	Light at ON state	
Current consumption	17 mA (24 VDC, at ON state)	
Operating temperature range	0 to 60°C (No condensation)	
Port size	M5 x 0.8, M6 x 1 (Option)	

Note) If not operated within the specified range of pressure and temperature, trouble may result.

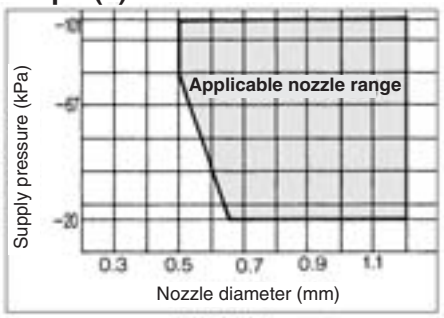
Applicable Adsorption Nozzle

Supply pressure and nozzle diameter are expressed in the graphs below.

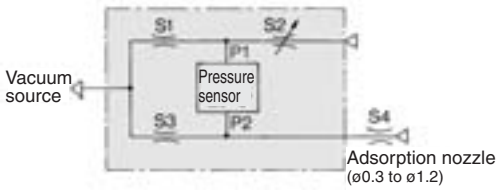
Graph (1)/ZSP1-S



Graph (2)/ZSP1-B



Pneumatic Circuit and Principle



Comprised of a pneumatically operated bridge circuit, this function puts the S4 picking nozzle into the non-picking state, and uses the S2 adjustment needle to balance (P1 ≅ P2) the pressure that is applied to the pressure sensor. The small pressure difference (P2 – P1) that is created when a part is picked by the (S4) picking nozzle and is detected by the pressure sensor.

* Wiring is the same as ZSE2.

How to Order

ZSP1 – S 0X □ – 15 □

Model

Symbol	Applicable model
S	Applicable nozzle dia. 0.3 to 0.7 mm
B	Applicable nozzle dia. 0.5 to 1.2 mm

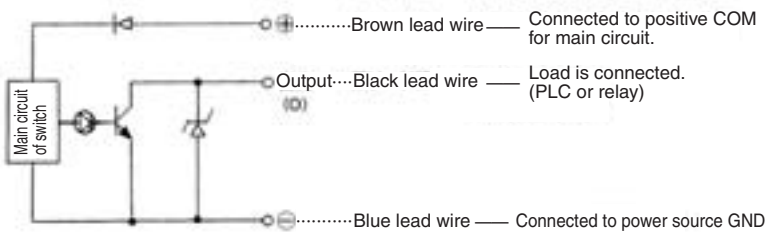
PV, V port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Piping specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)

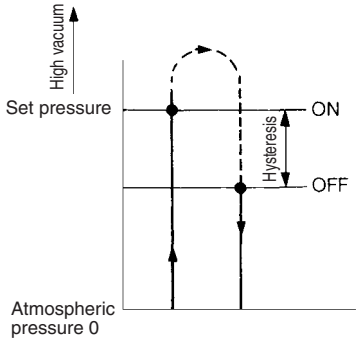
Circuit and Wiring



Vacuum Pressure Switch Unit/Adsorption Confirmation Switch: ZSP1-$^{S}_{B}$

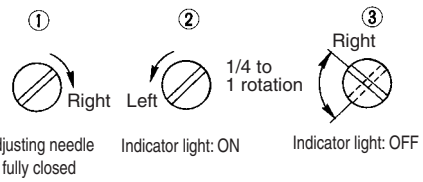
Hysteresis

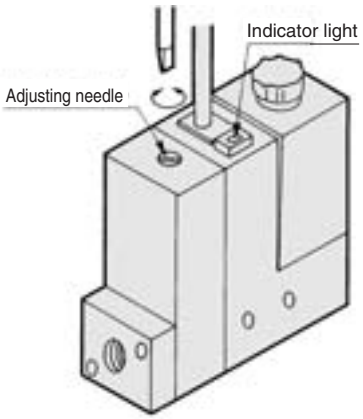
Hysteresis is the difference in pressure when the output signal is ON and OFF. The pressure to be set is the ON pressure.



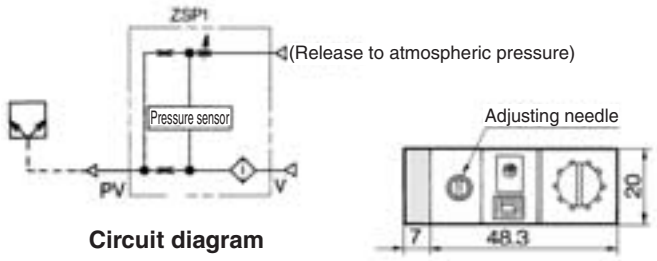
How to Set Adsorption Confirmation Needle

1. Apply a vacuum and current. Turn the adjusting needle clockwise until it stops, thus fully closing the needle valve.
2. Without attaching a workpiece to the picking nozzle, turn the adjusting needle counterclockwise and verify the position in which the indicator light turns ON.
3. From the state described in step 2, turn back the adjusting needle clockwise 1/4 turn to 1 full turn.
4. Pick a workpiece with the nozzle and readjust the adjusting needle so that the indicator light turns ON when the nozzle has picked the workpiece successfully.

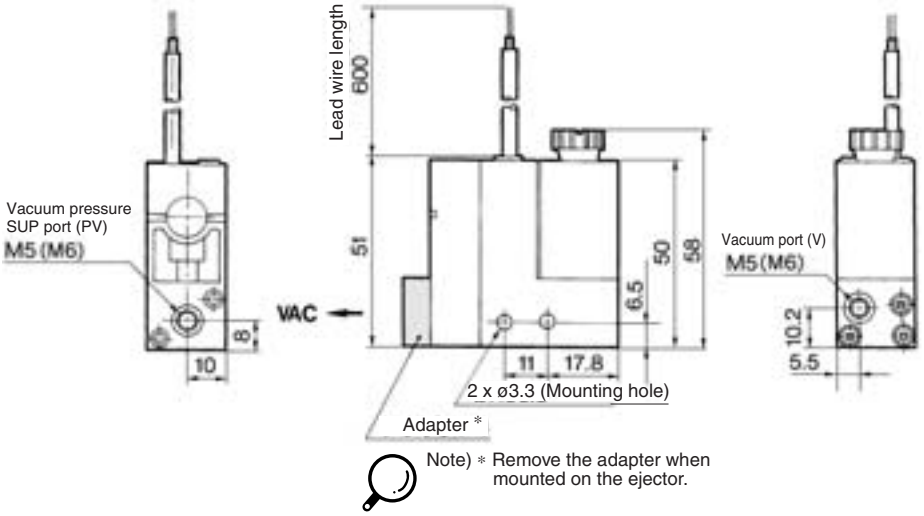




Adsorption Confirmation Switch: ZSP1-□0X□-15

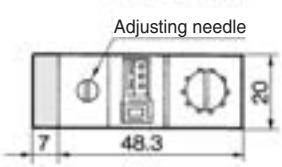


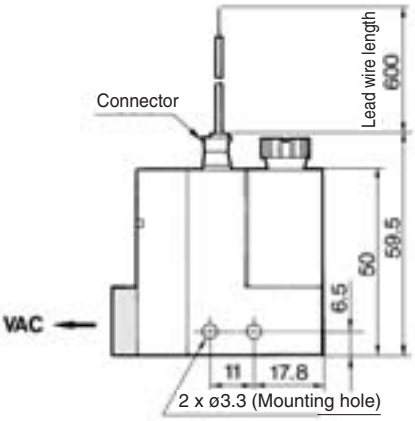
Circuit diagram



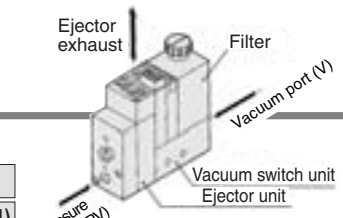
Note) * Remove the adapter when mounted on the ejector.

Connector: ZSP1-□0X□-15





Without Valve Unit



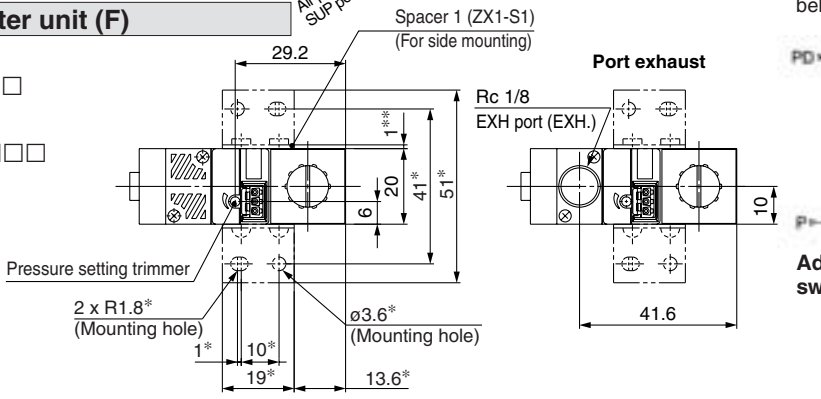
Configuration and combination

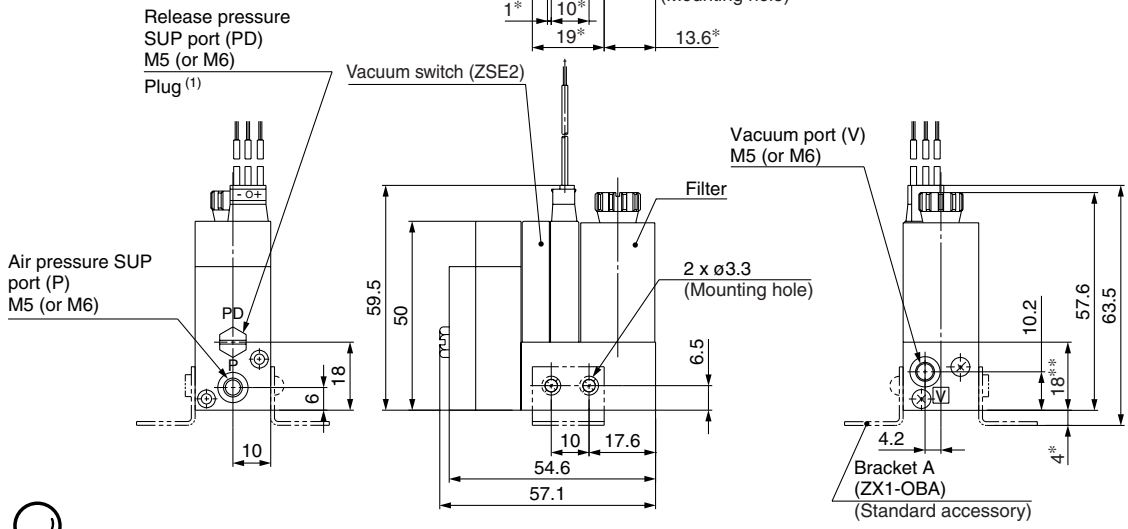
Ejector unit + **Vacuum switch (ZSE2)** / **Adsorption confirmation switch (ZSP1)** / **Filter unit (F)**

Model

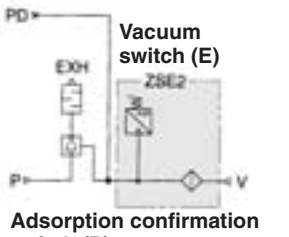
ZX1□□□ — **E□** **P□□** **F** **D□□□**

Vacuum switch (ZSE2)
ZX1□□□-E□

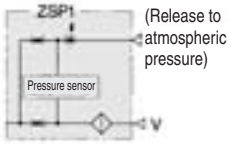




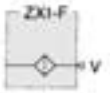
Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)



Adsorption confirmation switch (P)



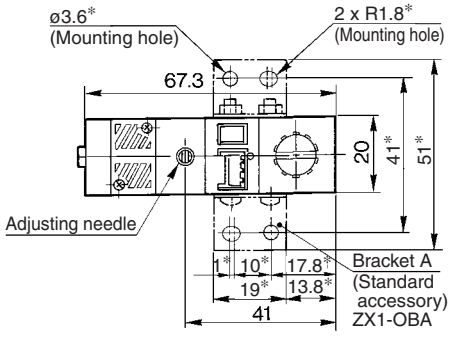
Filter unit (F)

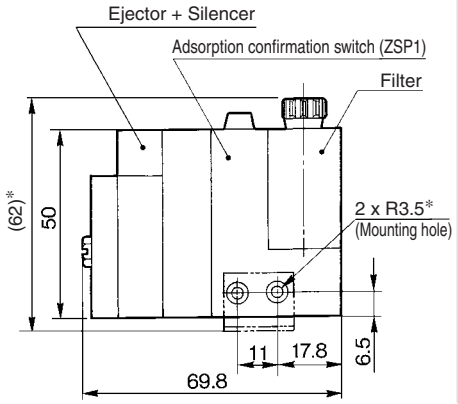


Note 1) Remove the plug at external release.

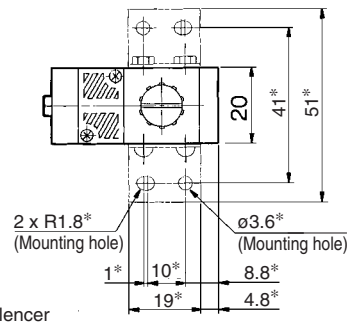
Note 2) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

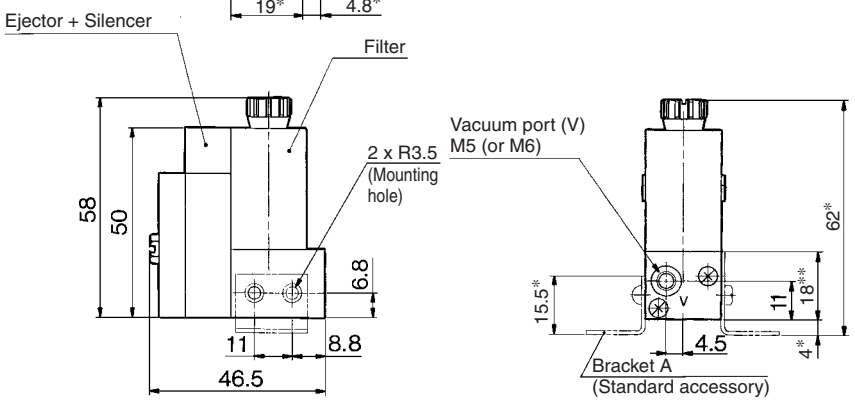
Adsorption confirmation switch (ZSP1)
ZX1□□□-P□□



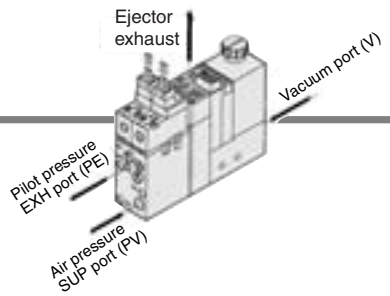


Filter unit (F)
ZX1□□□-F





Valve Unit: Type K1



Configuration and combination

Ejector unit + Valve unit (K1) +

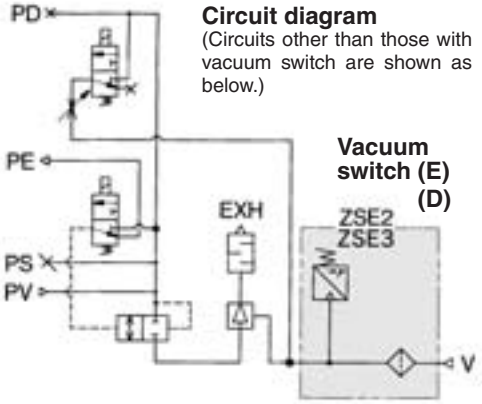
- Vacuum switch (ZSE2)
- Vacuum switch (ZSE3)
- Adsorption confirmation switch (ZSP1)
- Filter unit (F)
- Without switch and filter

Model

ZX1□□□ — K1□□□□ —

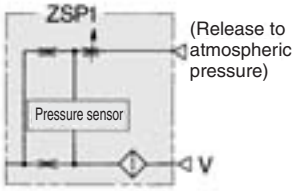
- E□
- D□□□
- P□□
- F□
- Nil

Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

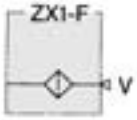


Vacuum switch (E) (D)

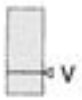
Adsorption confirmation switch (P)



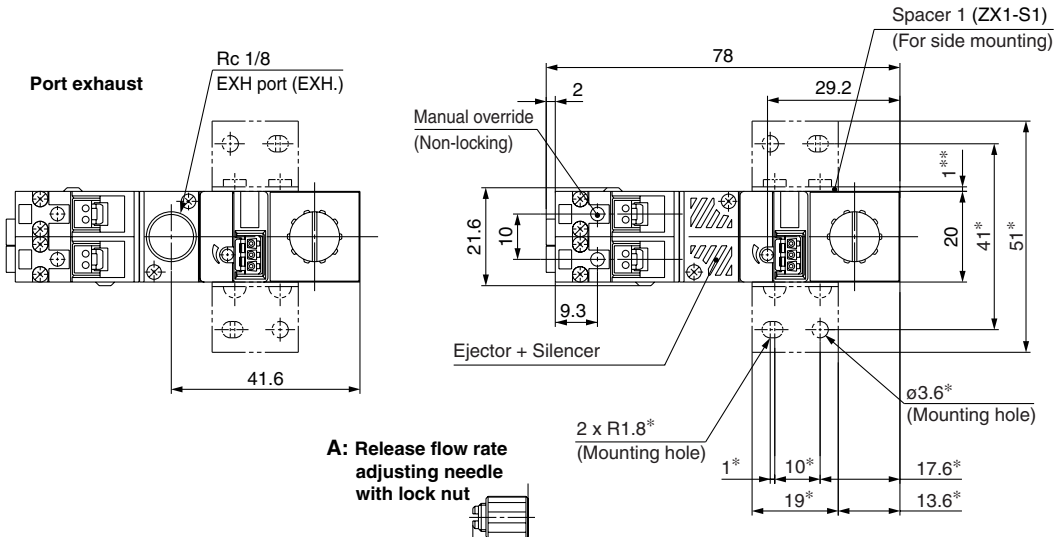
Filter unit (F)

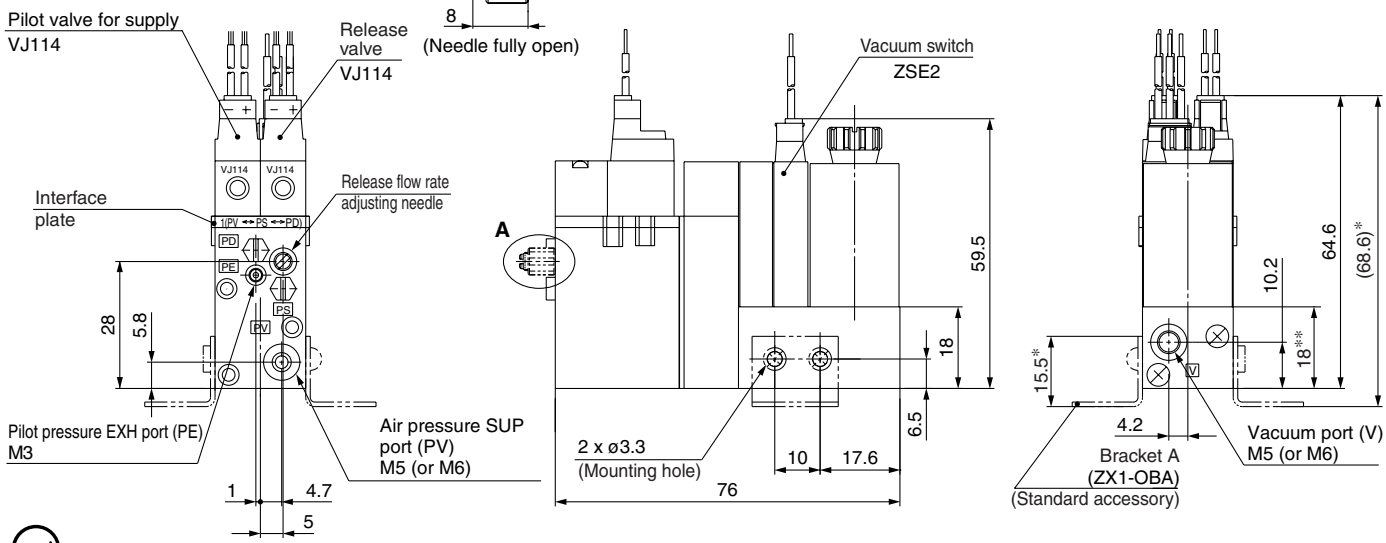


Without switch and filter



Vacuum switch (ZSE2)
ZX1□□□-K1□□□□-E□

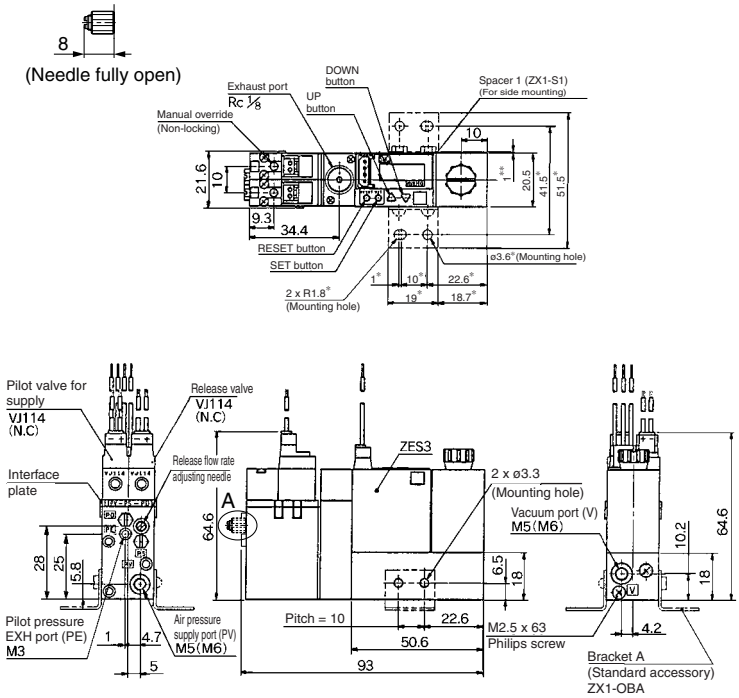




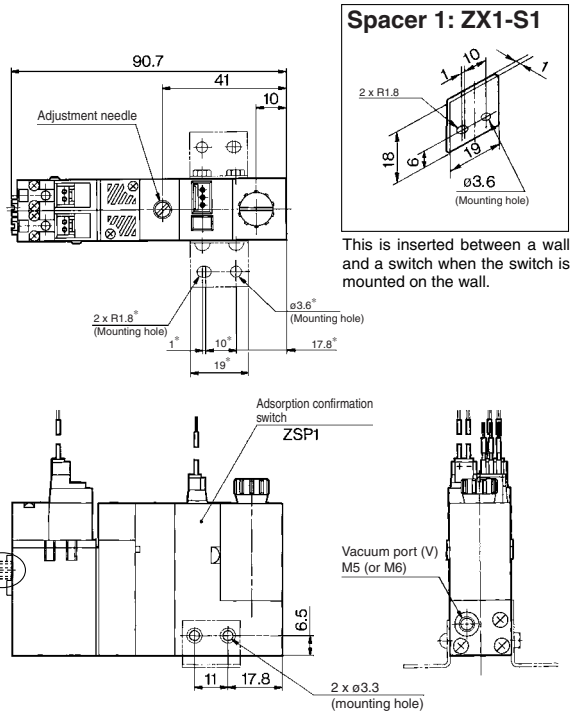
Note) Dimensions *: For mounting bracket A **: For mounting spacer 1.

Vacuum switch (ZSE3)
ZX1□□□-K1□□□-D□□□

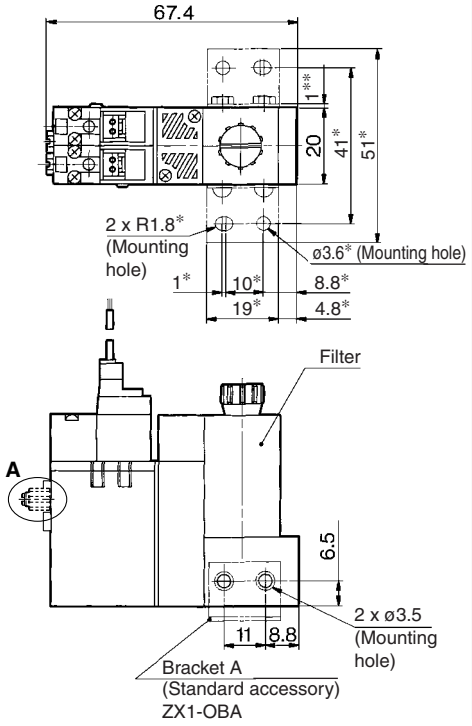
A: Release flow rate adjusting needle with lock nut



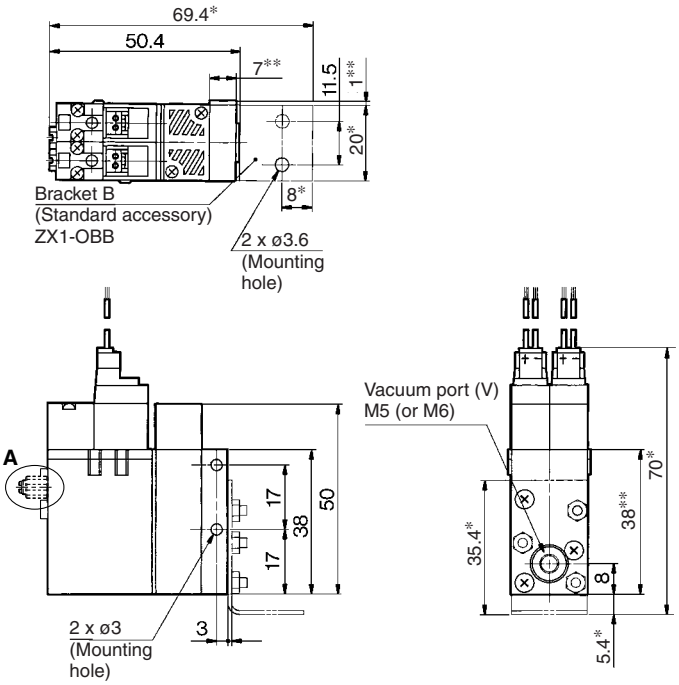
Adsorption confirmation switch (ZSP1)
ZX1□□□-K1□□□□-P□□



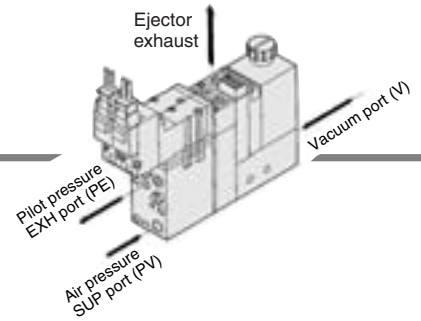
Filter unit
ZX1□□□-K1□□□□-F



Without switch and filter
ZX1□□□-K1□□□□



Valve Unit: Type K3



Configuration and combination

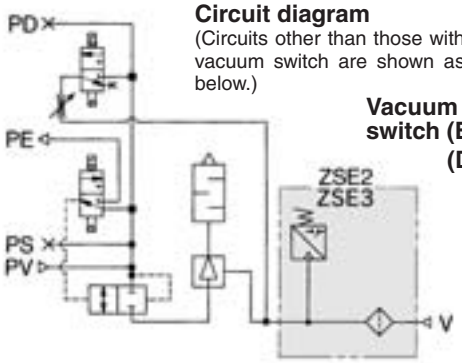
Ejector unit + Valve unit (K3) +

- Vacuum switch (ZSE2)
- Vacuum switch (ZSE3)
- Adsorption confirmation switch (ZSP1)
- Filter unit (F)
- Without switch and filter

Model
ZX1□□□ — K3□□□□ —

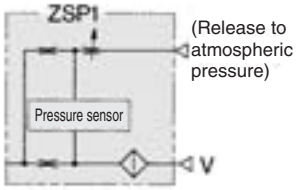
- E□
- P□□
- F
- D□□□
- Nil

Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

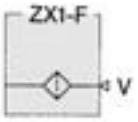


Vacuum switch (E) (D)

Adsorption confirmation switch (P)

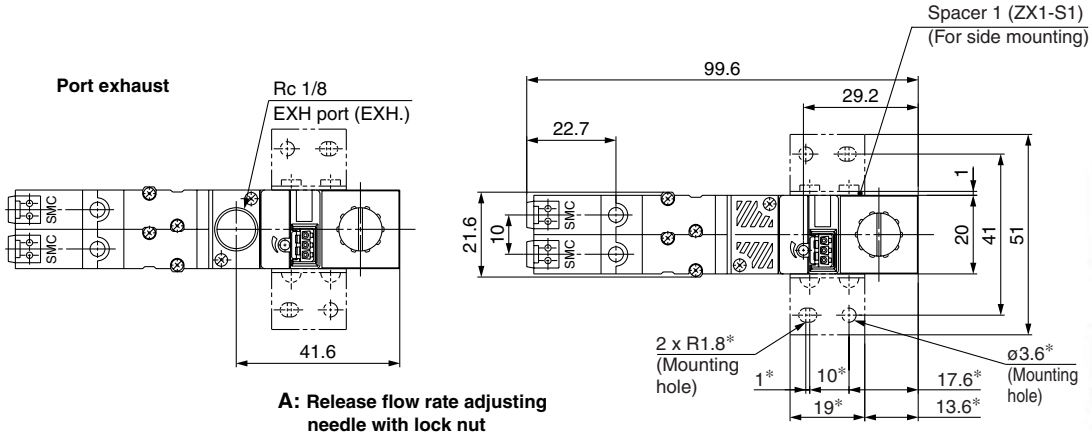


Filter unit (F)

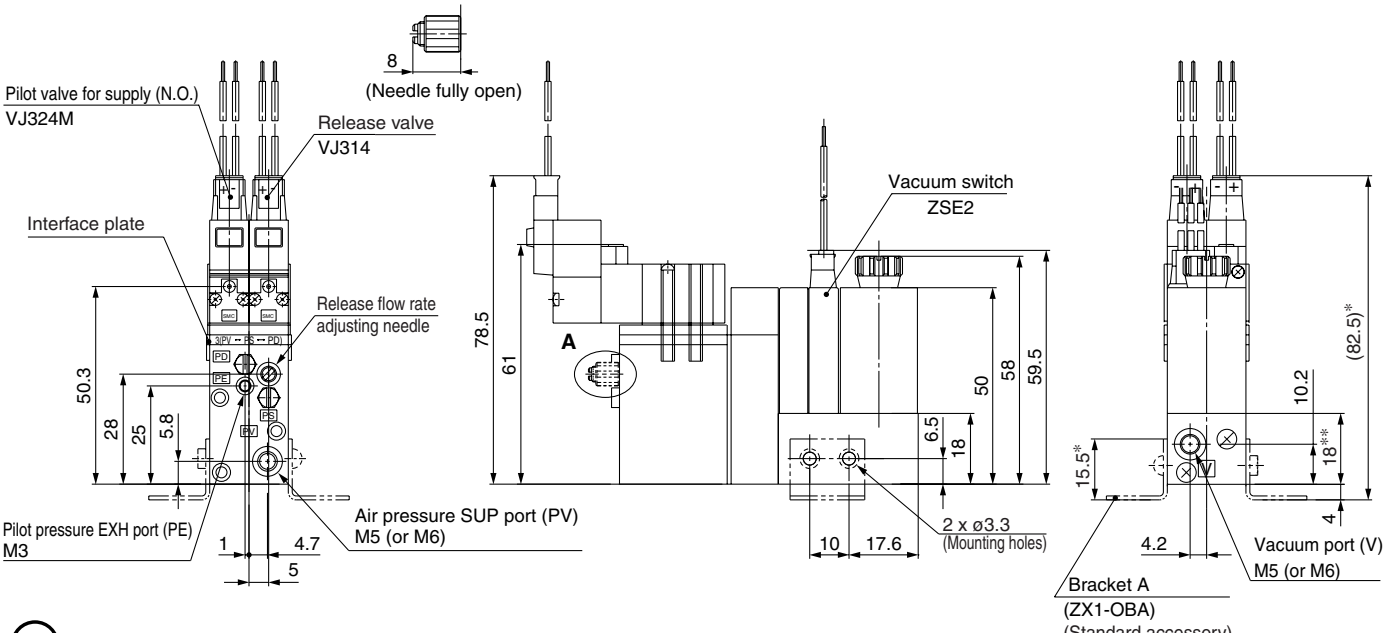


Without switch and filter

Vacuum switch (ZSE2)
ZX1□□□-K3□□□-E□

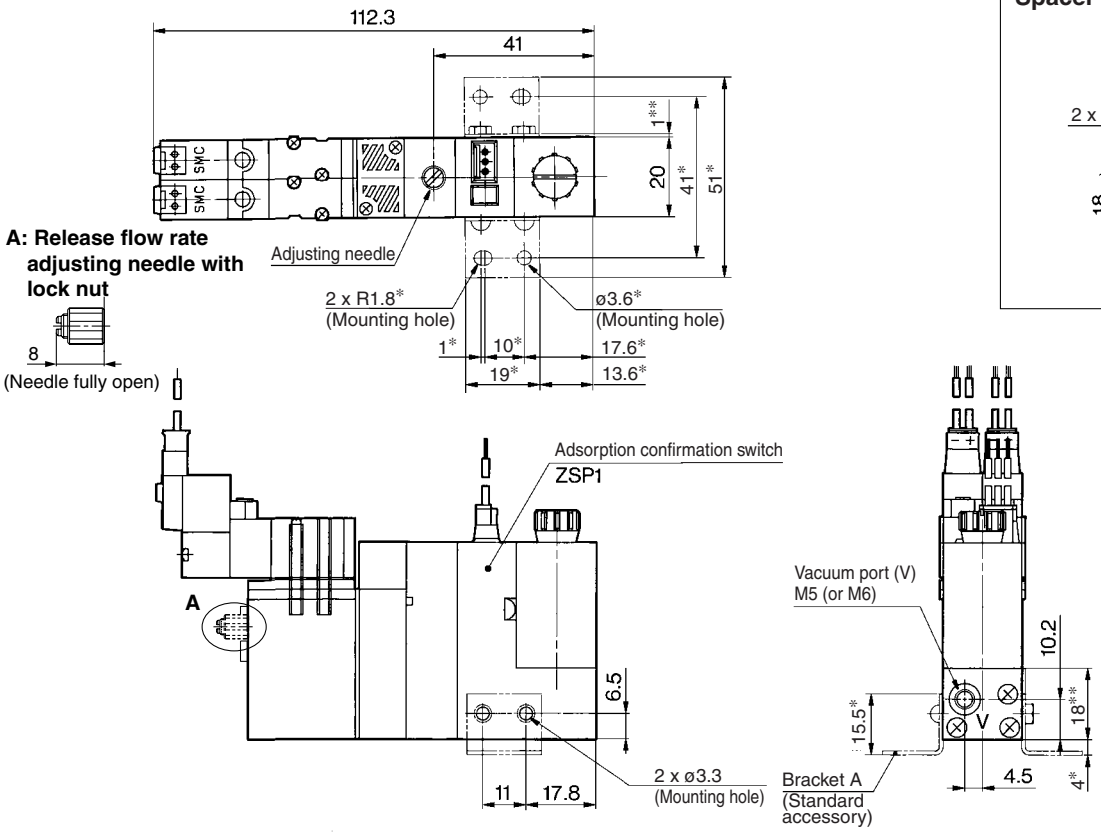


A: Release flow rate adjusting needle with lock nut

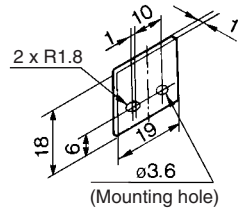


Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

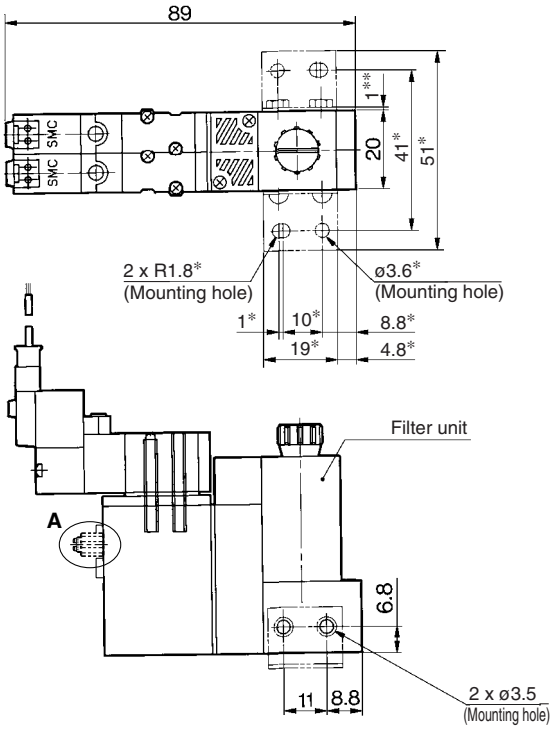
Adsorption confirmation switch (ZSP1)
ZX1□□□-K3□□□□-P□□



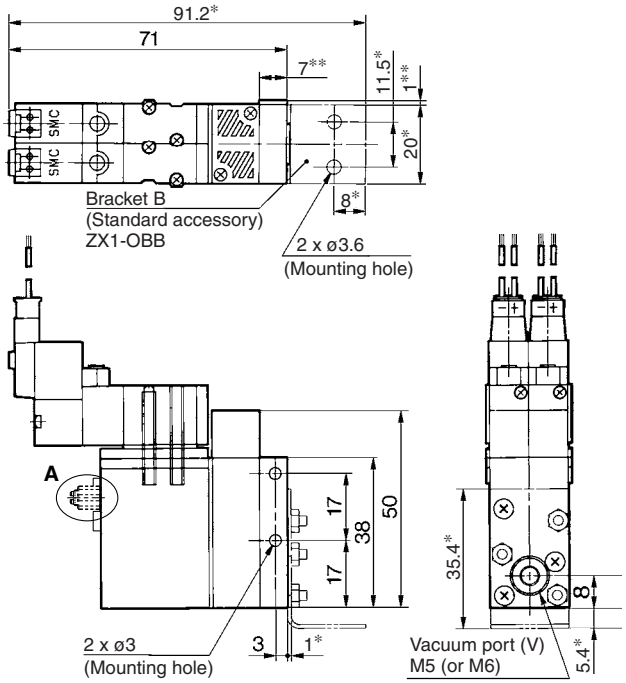
Spacer 1: ZX1-S1

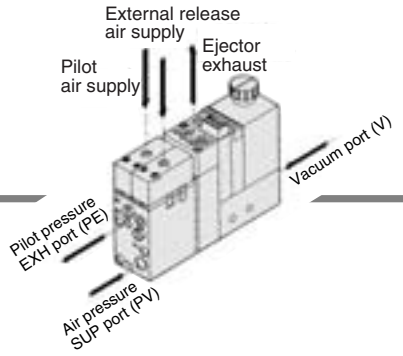


Filter unit (F)
ZX□□□-K3□□□□-F



Without switch and filter
ZX1□□□-K3□□□□





Valve Unit: Type K6

Configuration and combination

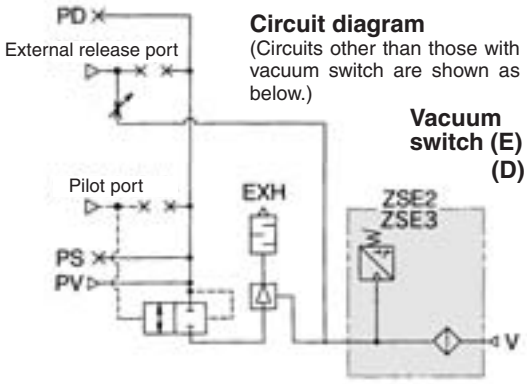
Ejector unit + **Valve unit (K6)** + **Adsorption confirmation switch (ZSP1)**

- **Vacuum switch (ZSE2)**
- **Vacuum switch (ZSE3)**
- **Adsorption confirmation switch (ZSP1)**
- **Filter unit (F)**
- **Without switch and filter**

Model

ZX1□□□ — K6□□□□ —

- **E□**
- **P□□**
- **F**
- **D□□□**
- **Nil**

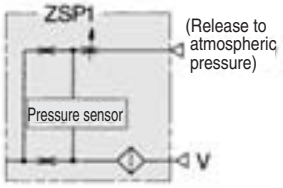


Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

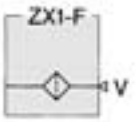
Vacuum switch (E) (D)

Vacuum switch (ZSE2)
ZX1□□□ - K6-E□

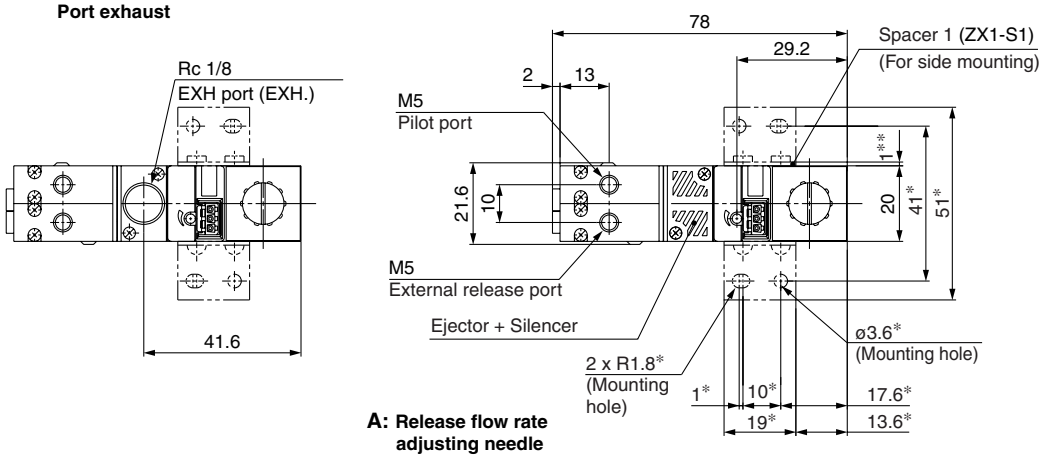
Adsorption confirmation switch (P)

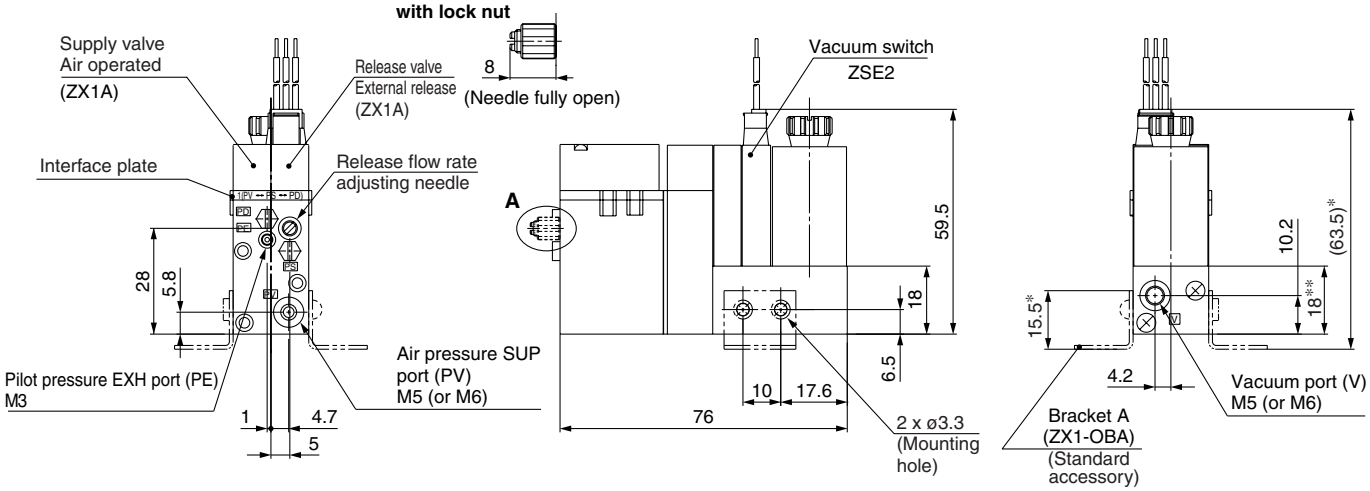


Filter unit (F)



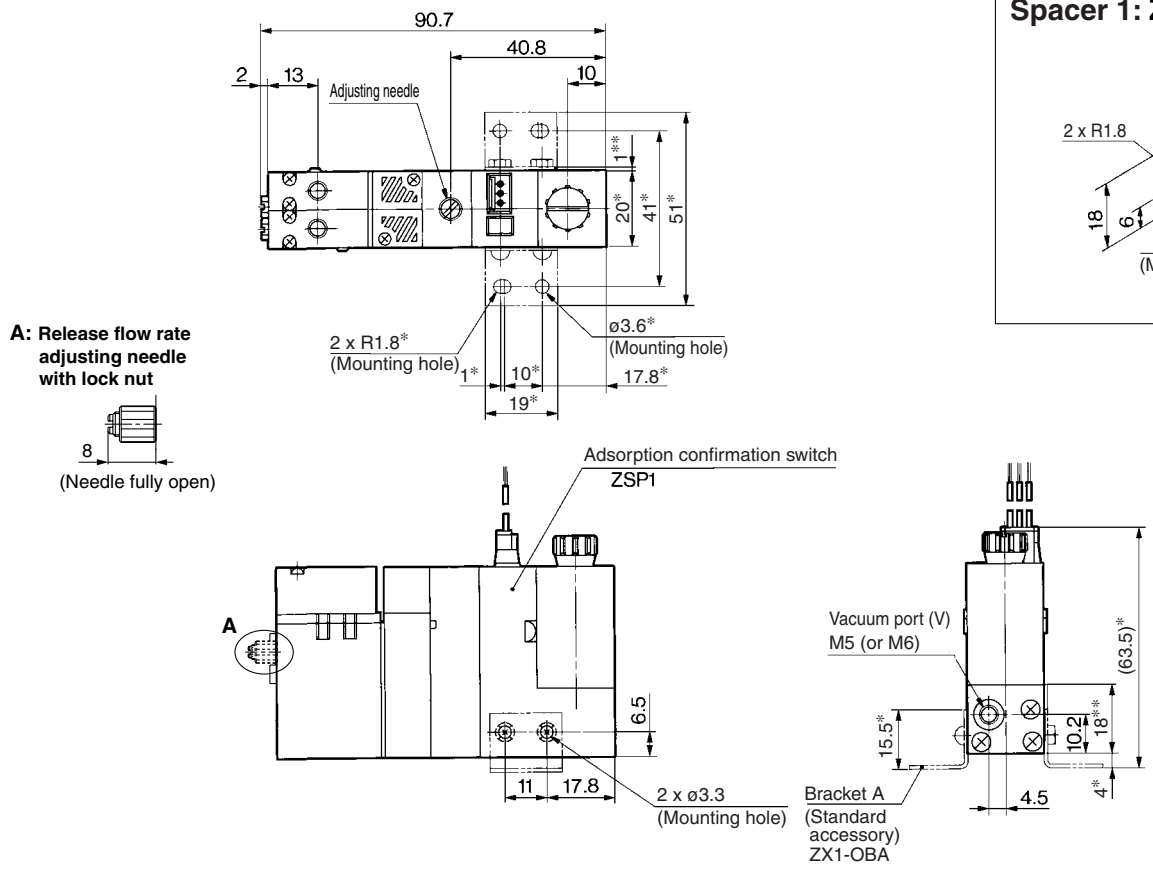
Without switch and filter



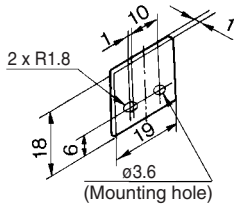


Note) Dimensions ∗: For mounting bracket B ∗∗: For mounting spacer 2.

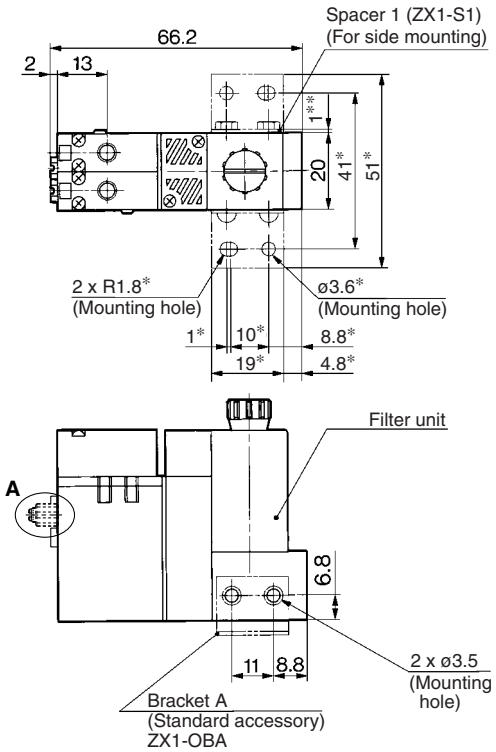
Adsorption confirmation switch (ZSP1)
ZX1□□□-K6-P□□



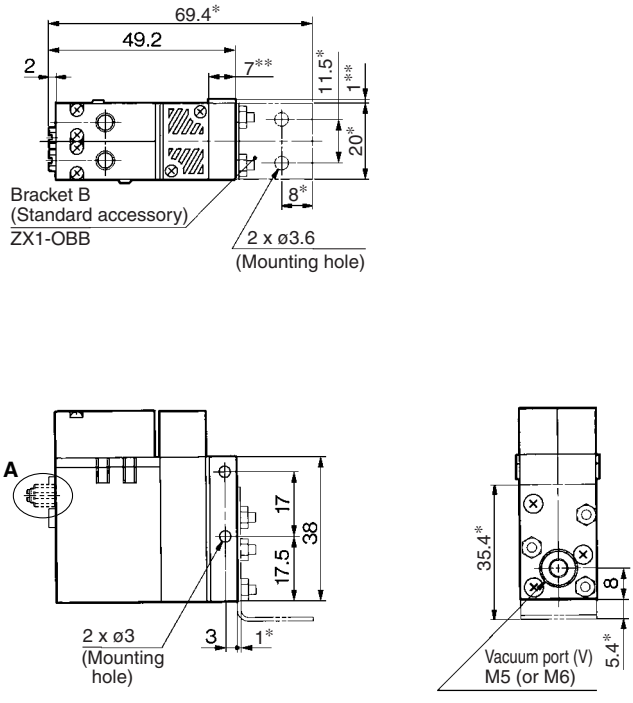
Spacer 1: ZX1-S1



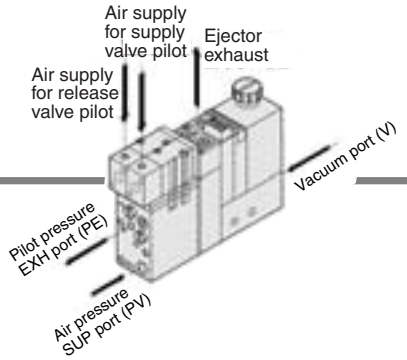
Filter unit (F)
ZX1-□□□-K6-F



Without switch and filter
ZX1□□□-K6



Valve Unit: Type K8



Configuration and combination

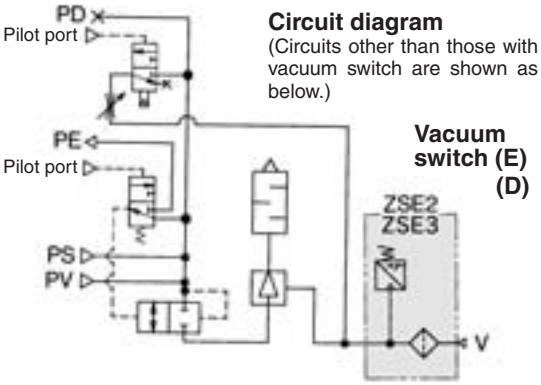
Ejector unit + Valve unit (K8) +

- Vacuum switch (ZSE2)
- Vacuum switch (ZSE3)
- Adsorption confirmation switch (ZSR1)
- Filter unit (F)
- Without switch and filter

Model

ZX1□□□ — K8 —

- E□
- P□□
- F
- D□□□
- Nil

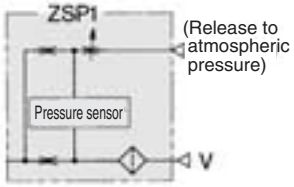


Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

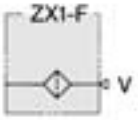
Vacuum switch (E) (D)

Vacuum switch (ZSE2)
ZX1□□□-K8-E□

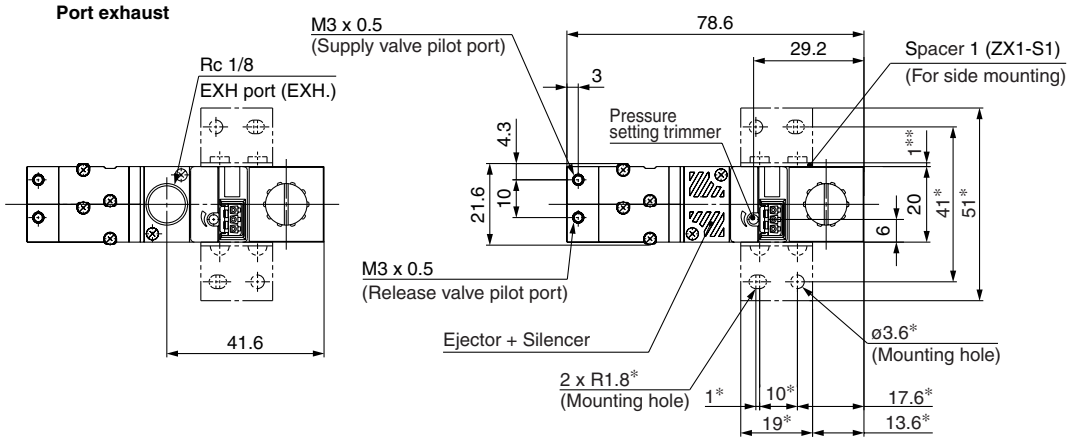
Adsorption confirmation switch (P)



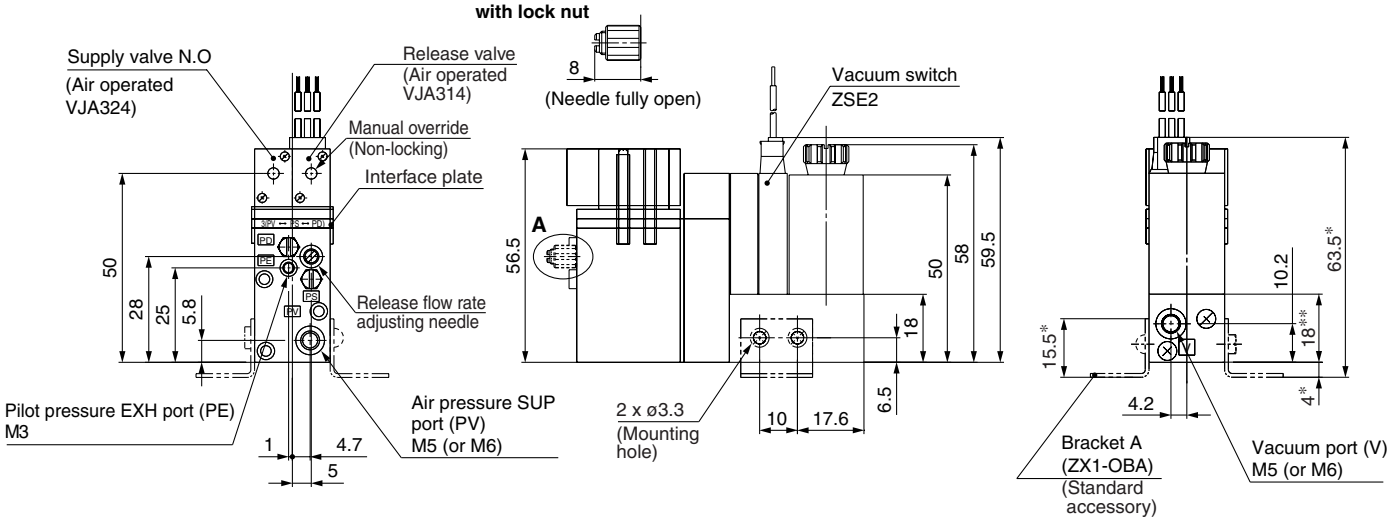
Filter unit (F)



Without switch and filter

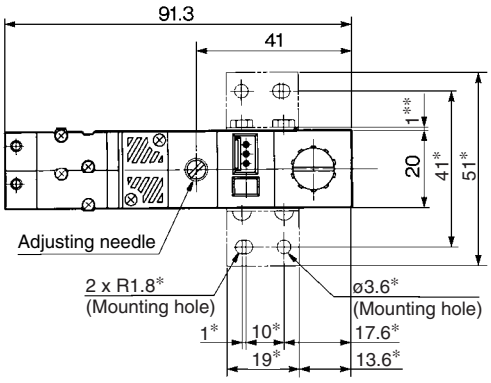


A: Release flow rate adjusting needle with lock nut

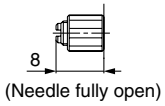


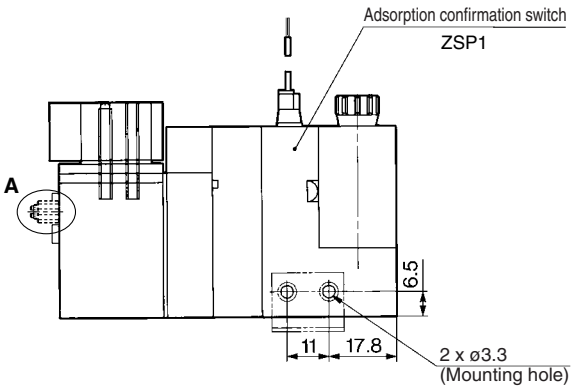
Note) Dimensions *: For mounting bracket A **: For mounting spacer 1.

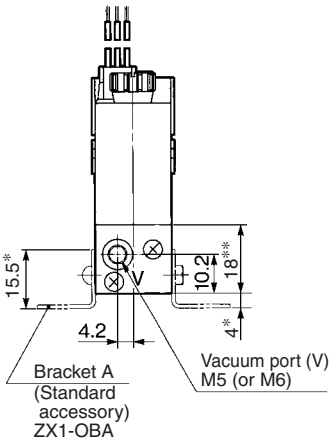
Adsorption confirmation switch (ZSP1)
ZX1□□□-K8-P□□



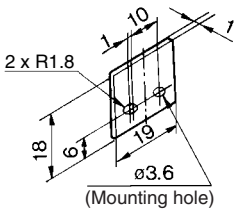
A: Release flow rate adjusting needle with lock nut



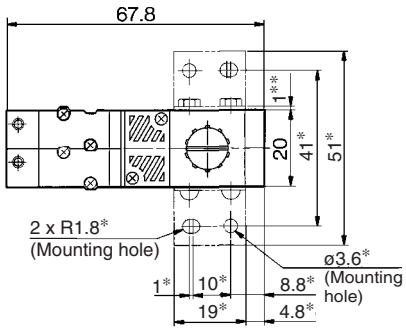


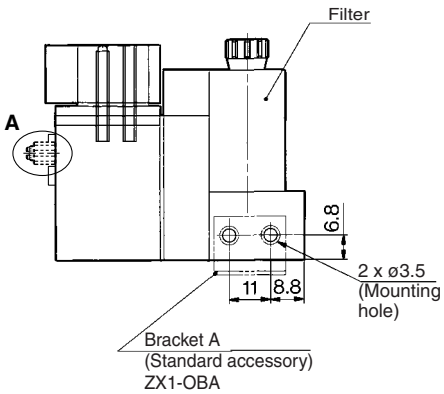


Spacer 1: ZX1-S1

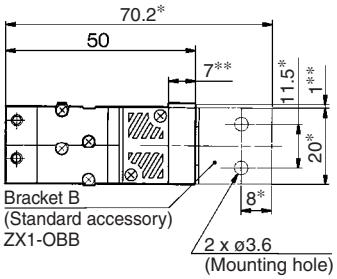


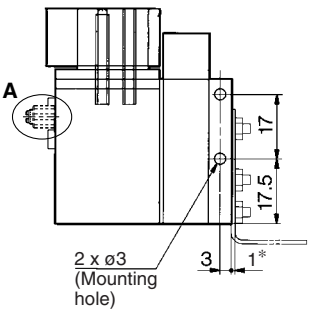
Filter unit (F)
ZX1□□□-K8-F

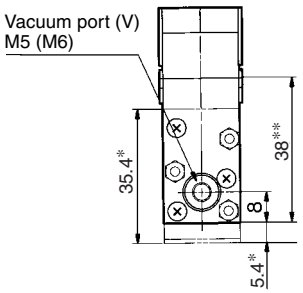




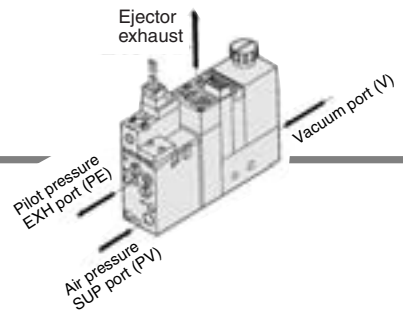
Without switch and filter
ZX1□□□-K8







Valve Unit: Type J1



Configuration and combination

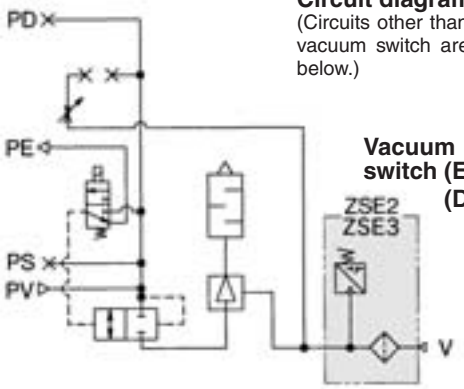
Ejector unit + Valve unit (J1) +

- **Vacuum switch (ZSE2)**
- **Vacuum switch (ZSE3)**
- **Adsorption confirmation switch (ZSP1)**
- **Filter unit (F)**
- **Without switch and filter**

Model
ZX1□□□ — J1□□□□ —

- **E□**
- **P□□**
- **F**
- **D□□□**
- **Nil**

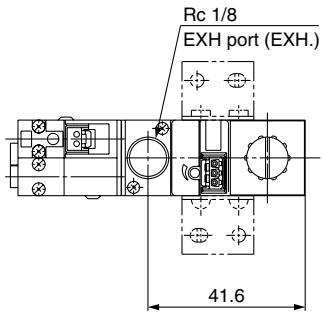
Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

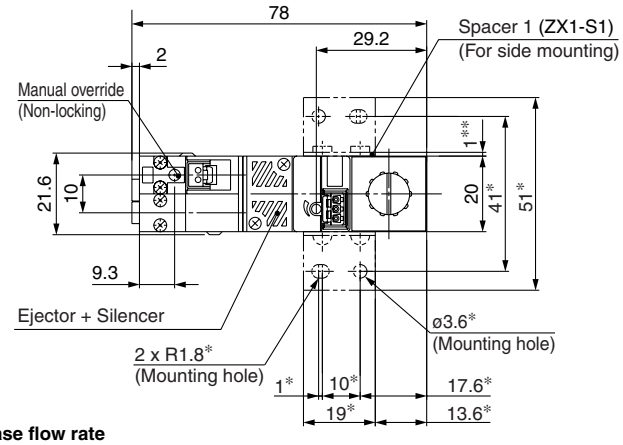


Vacuum switch (E) (D)

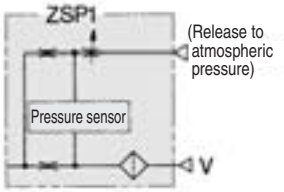
Vacuum switch (ZSE2)
ZX1□□□-J1□□□□-E□

Port exhaust

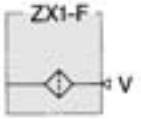




Adsorption confirmation switch (P)

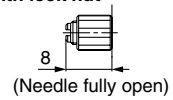


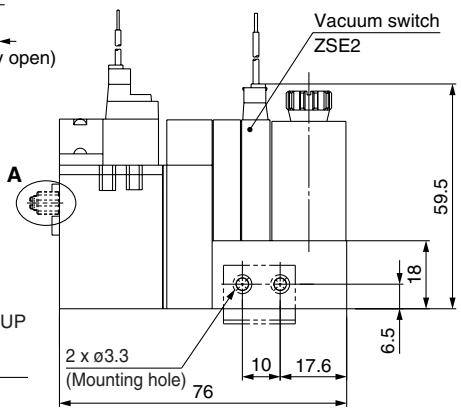
Filter unit (F)

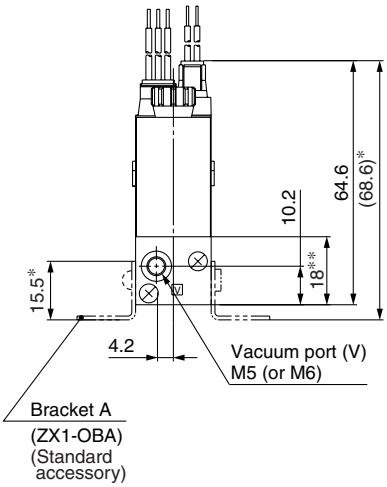


Without switch and filter

A: Release flow rate adjusting needle with lock nut

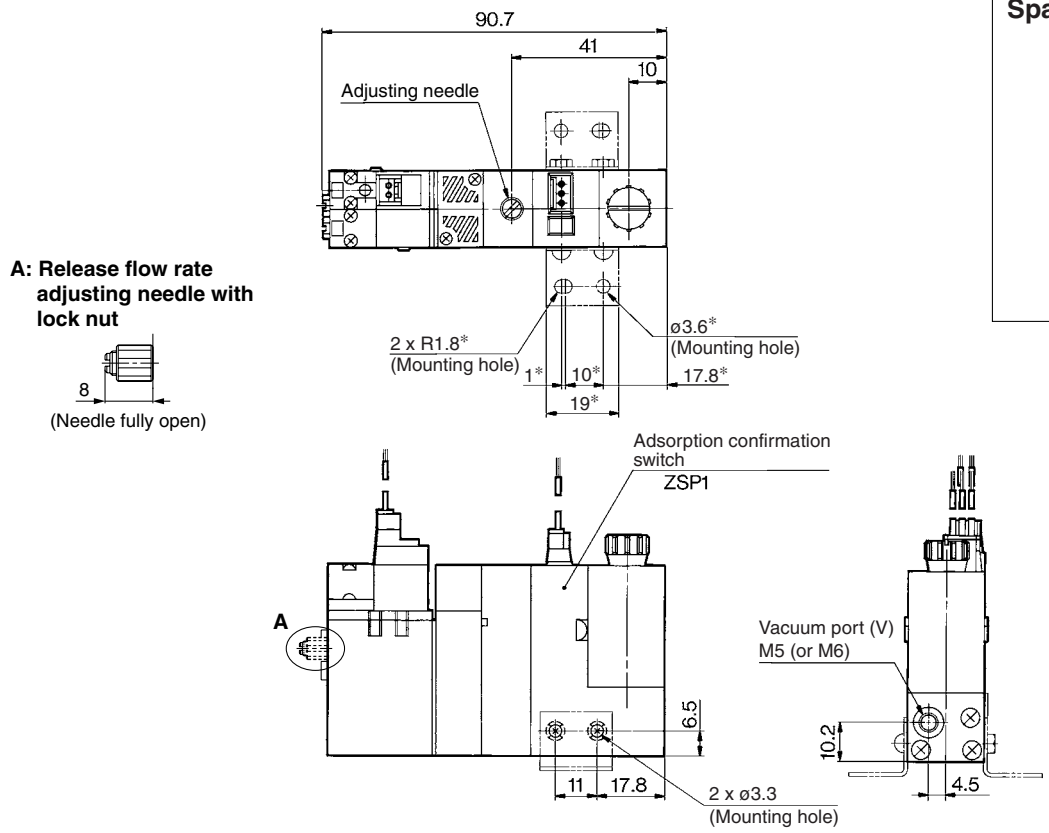




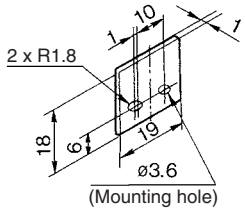


Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

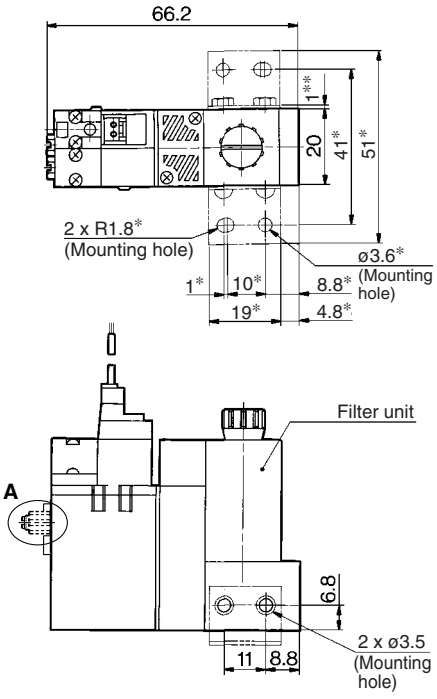
Adsorption confirmation switch (ZSP1)
ZX1□□-J1□□□□-P□□



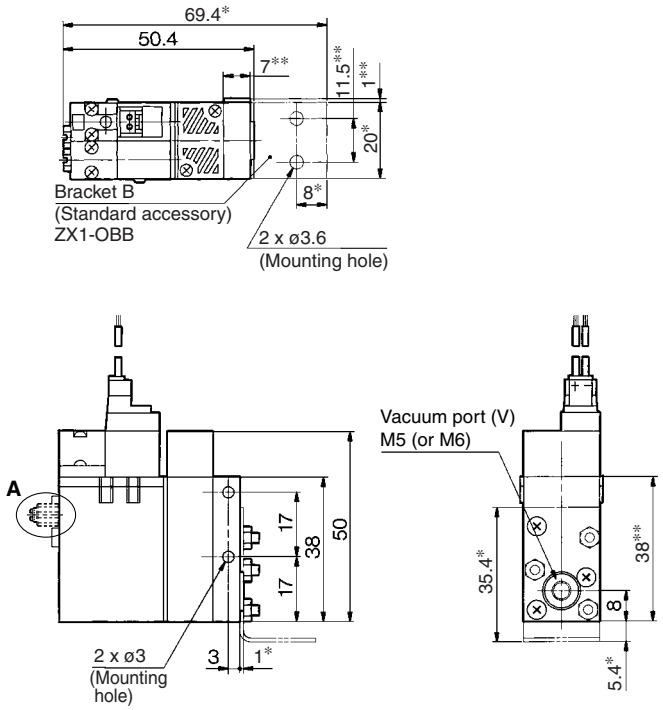
Spacer 1: ZX1-S1



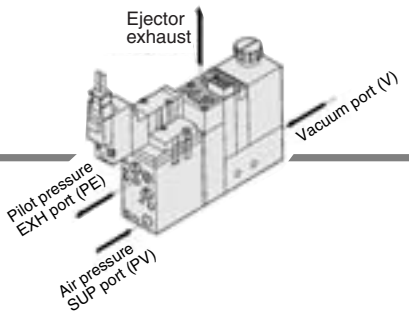
Filter unit (F)
ZX1□□□-J1□□□□-F



Without switch and filter
ZX1□□□-J1□□□□



Valve Unit: Type J2



Configuration and combination

Ejector unit + Valve unit (J2) +

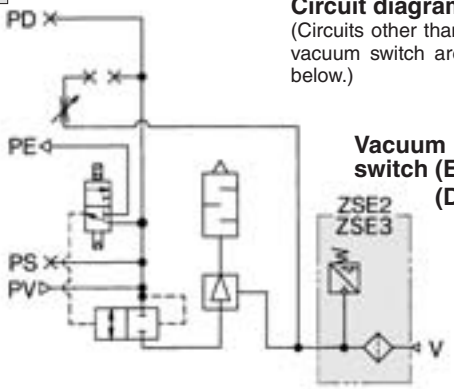
- **Vacuum switch (ZSE2)**
- **Vacuum switch (ZSE3)**
- **Adsorption confirmation switch (ZSP1)**
- **Filter unit (F)**
- **Without switch and filter**

Model

ZX1□□□ — J2□□□□ —

- **E□**
- **P□□**
- **F**
- **D□□□**
- **Nil**

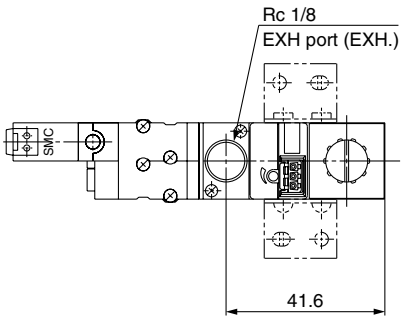
Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

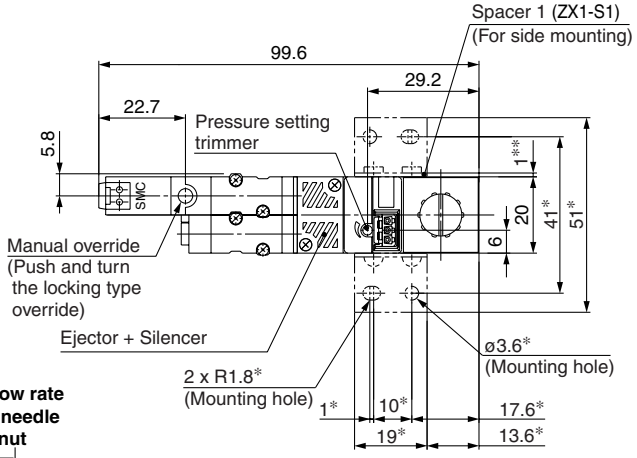


Vacuum switch (E) (D)

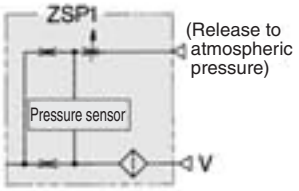
Vacuum switch (ZSE2)
ZX1□□□-J2□□□□-E□

Port exhaust

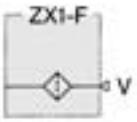




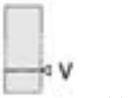
Adsorption confirmation switch (P)

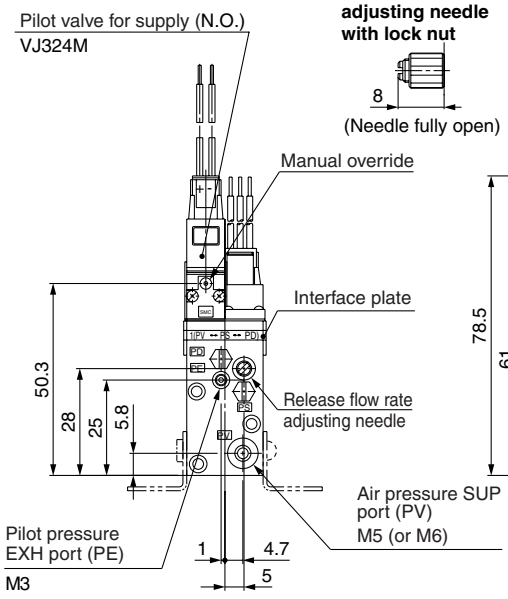


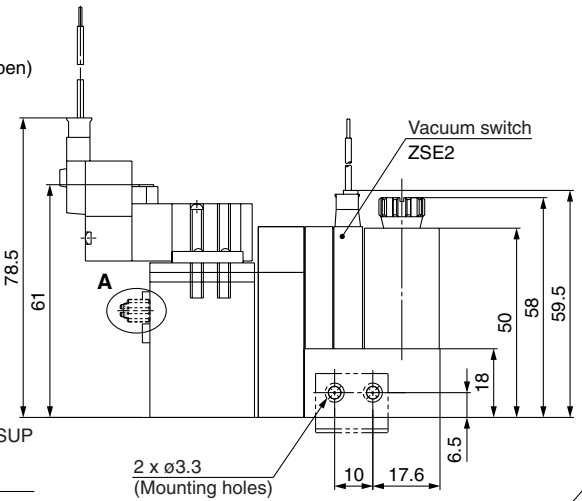
Filter unit (F)

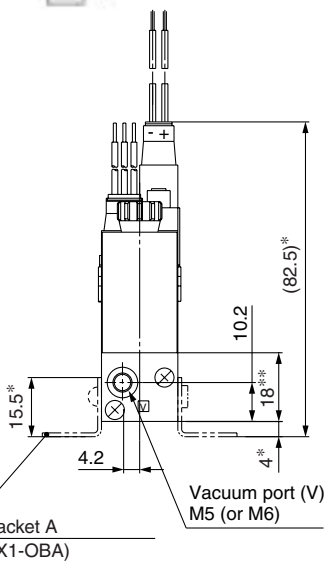


Without switch and filter



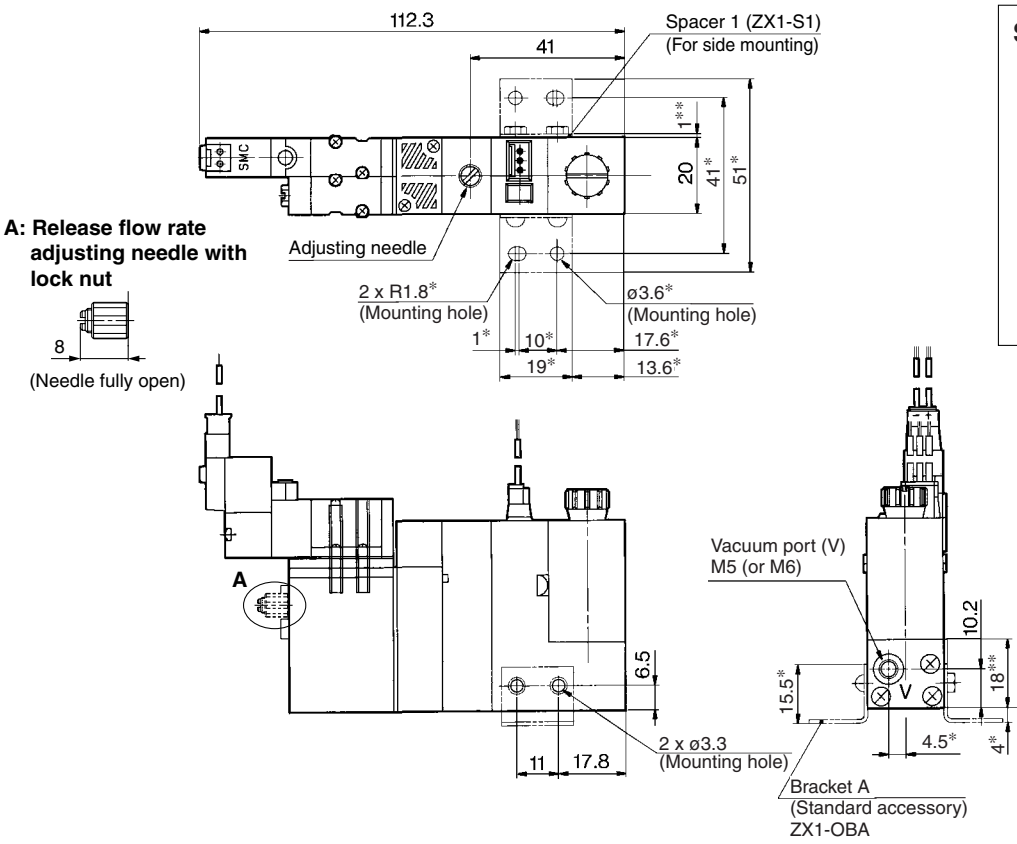




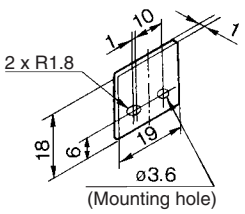


Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

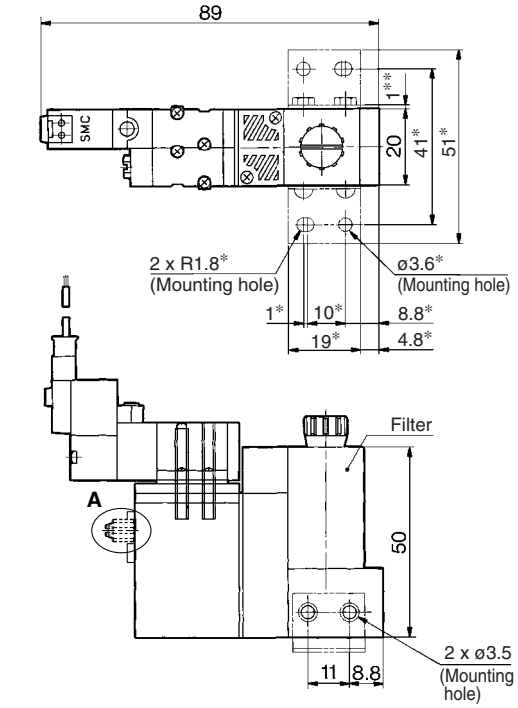
Adsorption confirmation switch (ZSP1)
ZX1□□□-J2□□□□-P□□



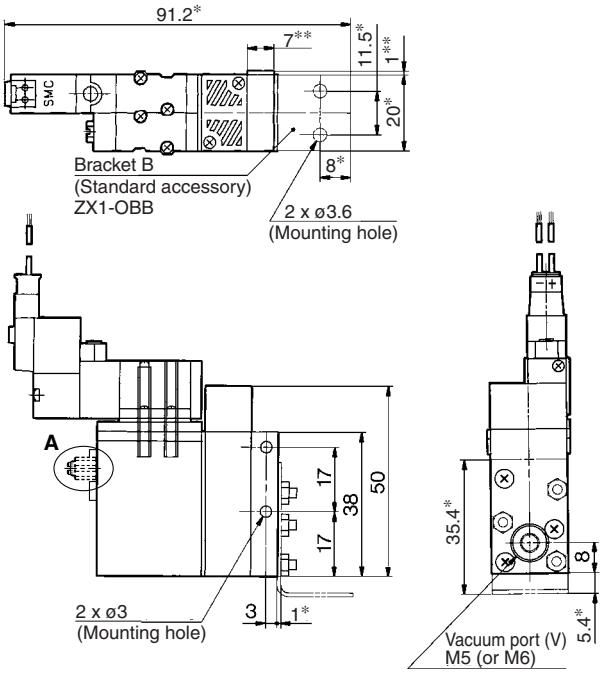
Spacer 1: ZX1-S1



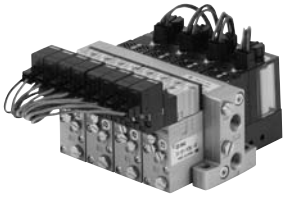
Filter unit (F)
ZX1□□□-J2□□□□-F

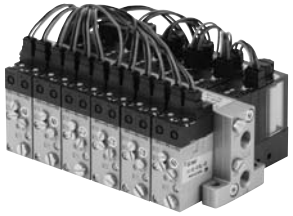


Without switch and filter
ZX1□□□-J2□□□□



Ejector System/Manifold Specifications





Specifications

Max. number of units		Max. 8 units
Port size	**Supply port [PV]**	1/8 (Rc, NPT, G)
	Exhaust port [EXH]	1/8 (Rc, NPT, G)
Mass		1 station: 73 g (50 g per additional station)

Note 1) PD port: Blank
Note 2) Exhaust air from both sides for 4 or more stations of ZX1103 manifold.

Air Supply

Manifold / Port / Supply port location	Left side		Right side	
	PV	**PS**	**PV**	**PS**
L (Left)	○	●	●	●
R (Right)	●	●	○	●
B (Both sides)	○	●	○	●

○: Supply ●: Plugged (EXH port is released to atmospheric pressure.)
Note) Blank plugs are attached to all ports of each valve unit.

How to Order Manifold

<Manifold base>

ZZX1 [06] – [ ] [R]

Stations

01	1
02	2
⋮	⋮
08	8

Thread of supply and exhaust port

Nil	Rc
F	G Note)
T	NPTF

Note) G thread
The thread ridge shape is compatible with the G thread standard (JIS B0202), but other shapes are not conforming to ISO16030 and ISO1179.

Supply port location ∗1)

R	Right side (PV port on the right side)
L	Left side (PV port on the left side)
B	Both sides (PV port on both sides)

∗1 Viewed from the front side of valve unit, confirm the port location on the right and/or left side.
∗2 EXH ports are released to atmospheric pressure in both sides.
Plugs are always attached to PD ports and all ports of the valve unit.

(Ordering example)
ZZX106-R····1 pc. (Manifold base)
∗ZX1101-K15LZ-EC(-Q)····5 pcs. (Vacuum single unit)
∗ZX1-BM1····1 pc. (Blank plate)

<Individual spacer>

Specify the individual spacer when separating the supply and exhaust ports of the manifold ejector.

ZX1 – [R1] – [1]

Individual spacer

R1
⋮
R16

∗Refer to the individual spacer.

(Ordering example)
If installed on station 1 and station 3:
ZZX106-R ·····1 pc.
∗ZX1101-K15LZ-EL(-Q) ·····6 pcs.
∗ZX1-R1-1
∗ZX1-R1-3
∗ZX1-R16 (Dummy spacer) ·····4 pcs.

Arrangement
(First station from the right end of the valve side is station 1.)

Nil	All stations
1	Station 1 only
⋮	⋮
8	Station 8 only

∗When spacers are mounted alternately, specify them together.
∗When retrofitting, 3 pcs. of M2.5 x 32 (for ZX) are necessary. A dummy spacer (ZX1-R16) must be mounted on the stations on which individual spacers are not mounted.

About individual spacers

- Manifold supply or valve unit supply can be selectable for each port. In the table below, ports with the symbol ↕ mean that they are manifold supply, while others are individual supply from the valve unit.
- Symbols in the table below are printed on the surface of individual spacers.

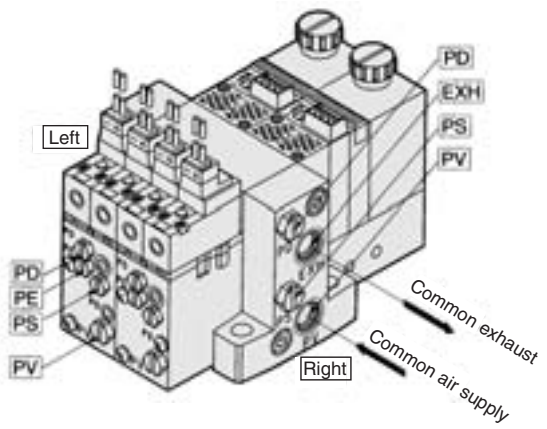
No.	Symbol	No.	Symbol
ZX1-R1	R1	**ZX1-R 9**	R 9 ↕PV
R2	R2 ↕PE	**R10**	R10 ↕PV ↕PE
R3	R3 ↕PD	**R11**	R11 ↕PV ↕PD
R4	R4 ↕PD ↕PE	**R12**	R12 ↕PV ↕PD ↕PE
R5	R5 ↕PS	**R13**	R13 ↕PV ↕PS
R6	R6 ↕PS ↕PE	**R14**	R14 ↕PV ↕PS ↕PE
R7	R7 ↕PS ↕PD	**R15**	R15 ↕PV ↕PS ↕PD
R8	R8 ↕PS ↕PD ↕PE	**R16**	R16 ↕PV ↕PS ↕PD ↕PE

⚠ Caution when ordering manifold

The asterisk denotes the symbol for assembly.
Prefix it to the ejector part numbers to be mounted. When it is not added, the manifold base and ejector are shipped separately.

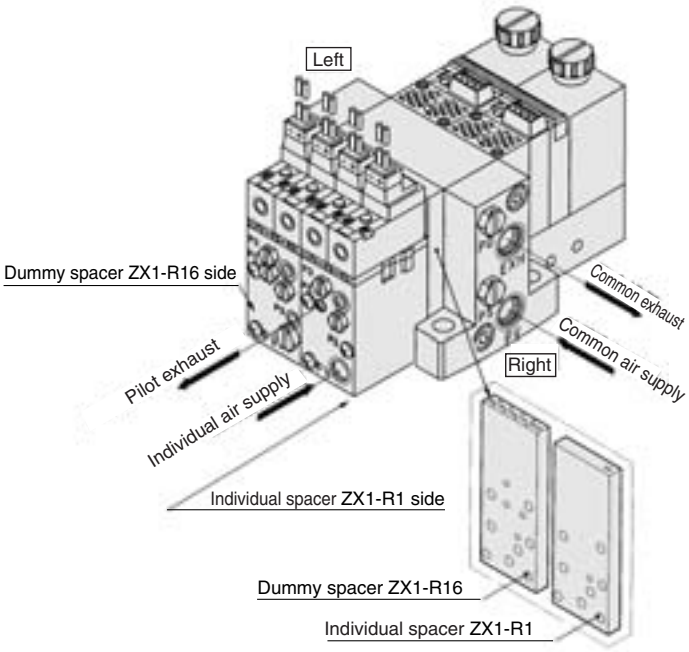
Manifold/System Circuit Example

When not using individual spacer

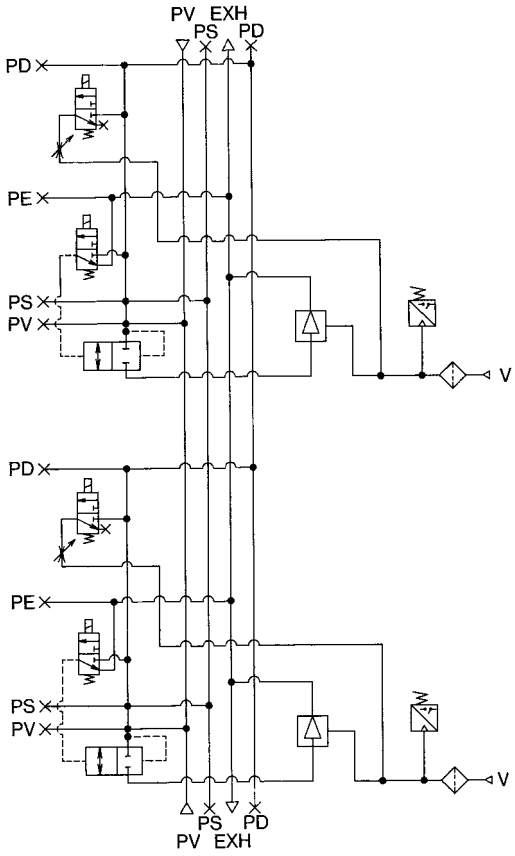


PV: Air pressure SUP port
PS: Pilot pressure SUP port
PD: Release pressure SUP port
PE: Pilot pressure EXH port
EXH: Common EXH port

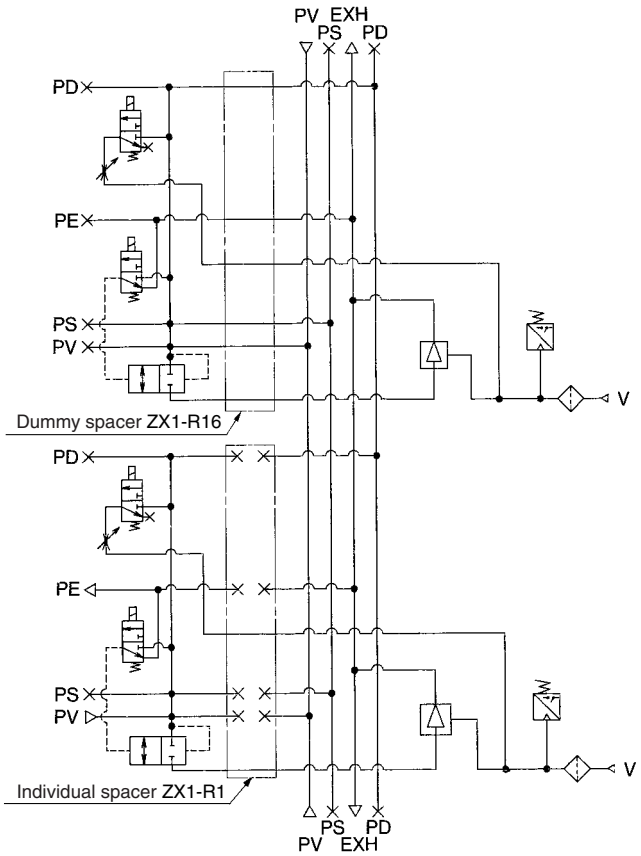
When using individual spacer (When using ZX1-R1)



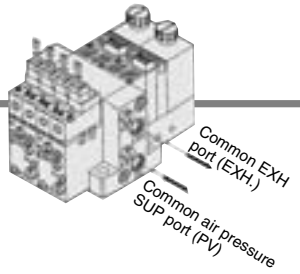
<System circuit example>

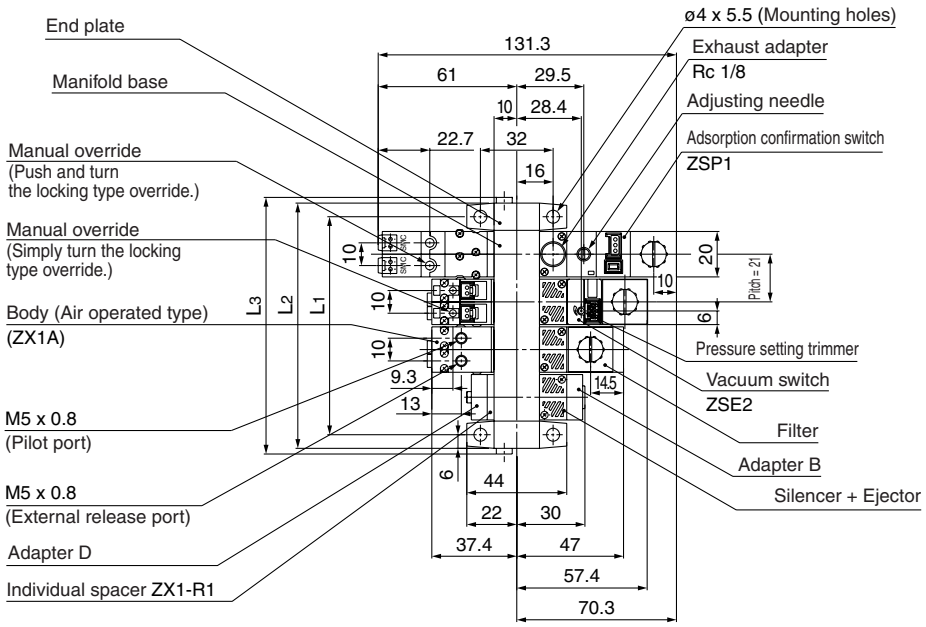


<System circuit example>

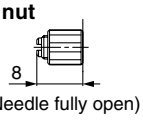


Ejector System Manifold

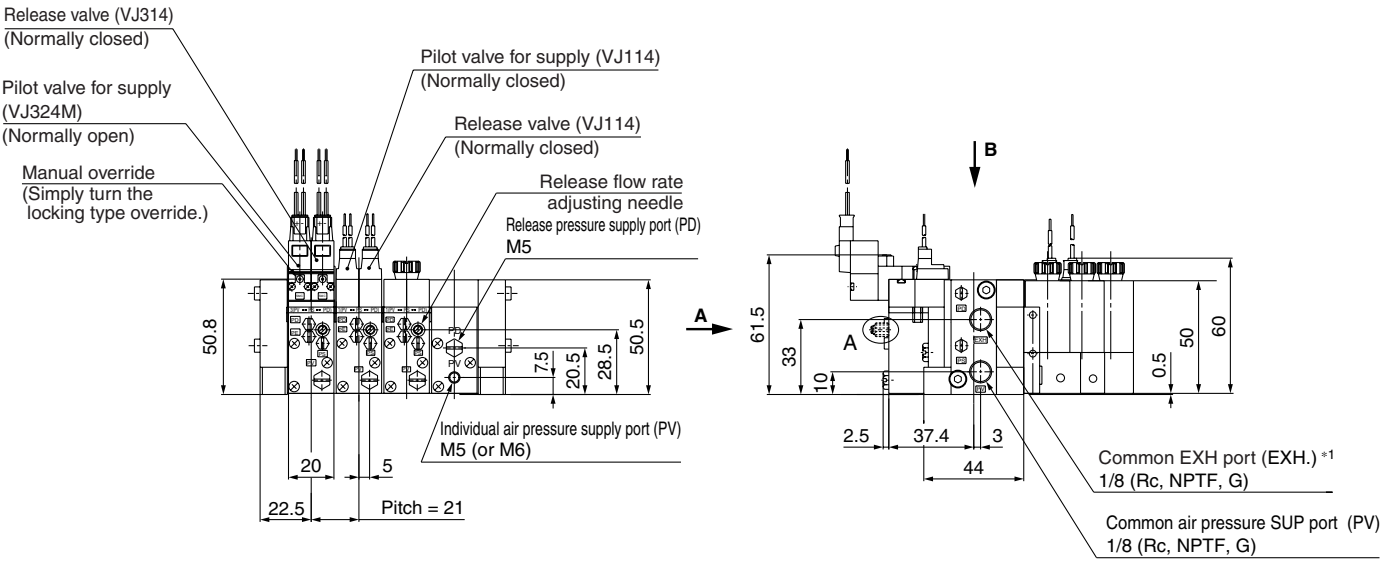




A: Release flow rate adjusting needle with lock nut



(Needle fully open)



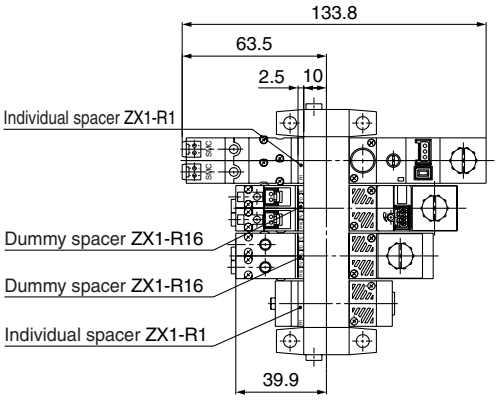
*1 The common exhaust port (EXH.) is also used as the pilot pressure exhaust (PE) port of pilot valve. Use while the port is open to the atmosphere.

(mm)

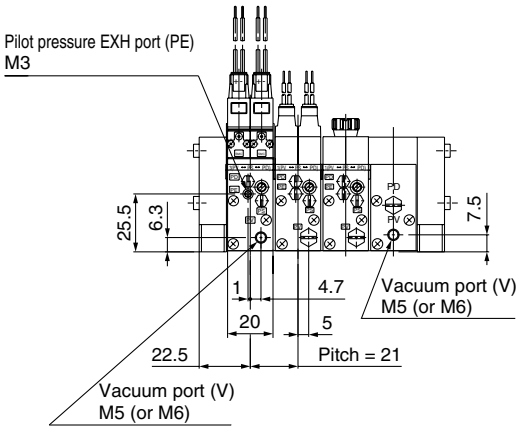
Symbol \ Stations	1	2	3	4	5	6	7	8
L1	33	54	75	96	117	138	159	180
L2	45	66	87	108	129	150	171	192
L3	50	71	92	113	134	155	176	197

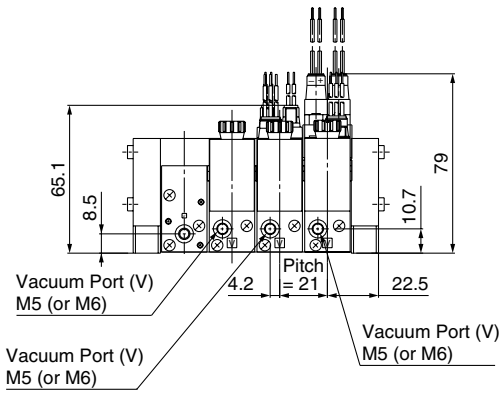
(In the case of individual spacer)

B cross section



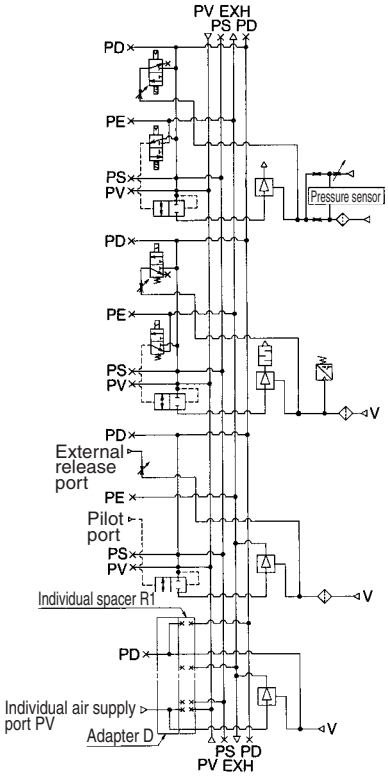
A cross section



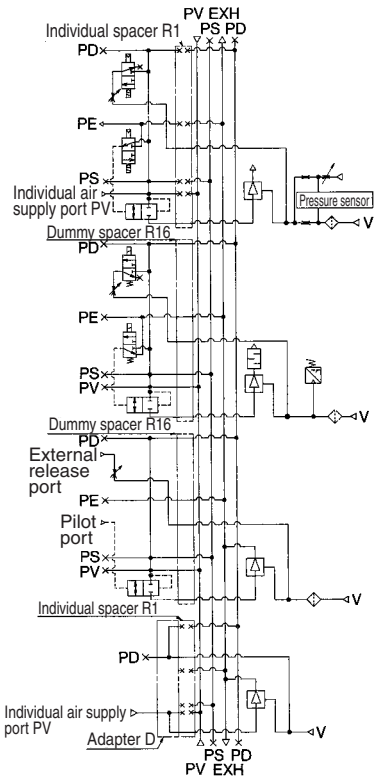


System circuit example

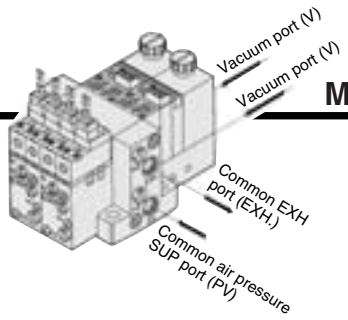
(Standard)



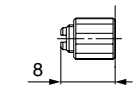
(Option)
(In the case of individual spacer)

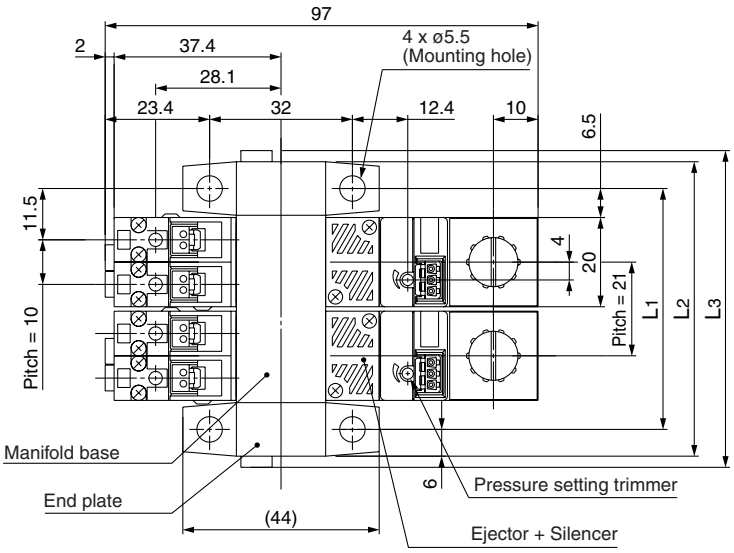


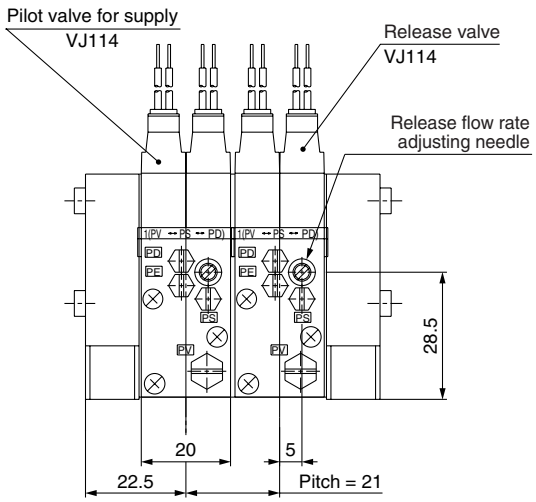
Ejector System — Manifold: Type K1

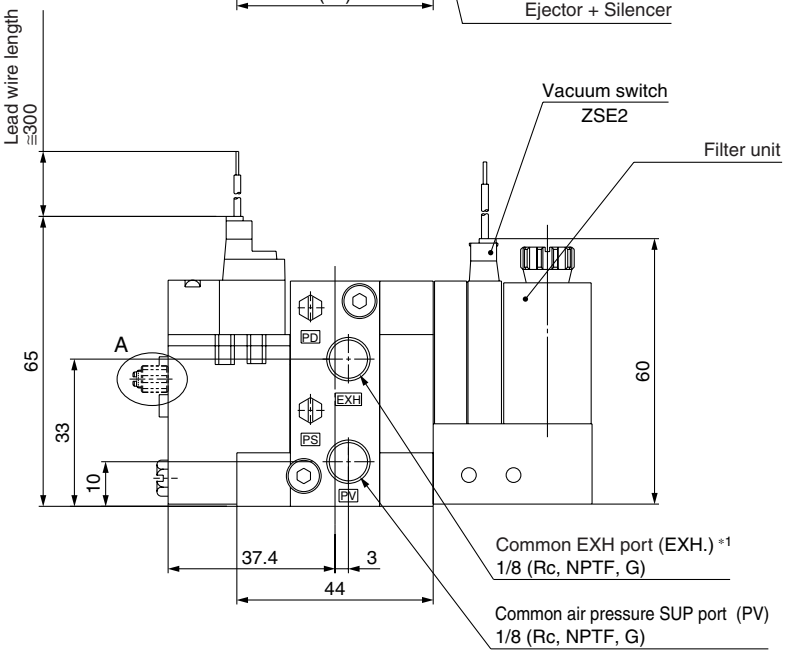


A: Release flow rate adjusting needle with lock nut









*1 The common exhaust port (EXH.) is also used as the pilot pressure exhaust (PE) port of pilot valve. Use while the port is open to the atmosphere.

(mm)

Symbol \ Stations	1	2	3	4	5	6	7	8
L1	33	54	75	96	117	138	159	180
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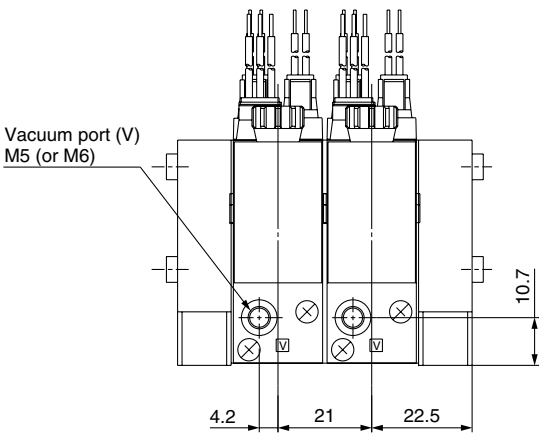
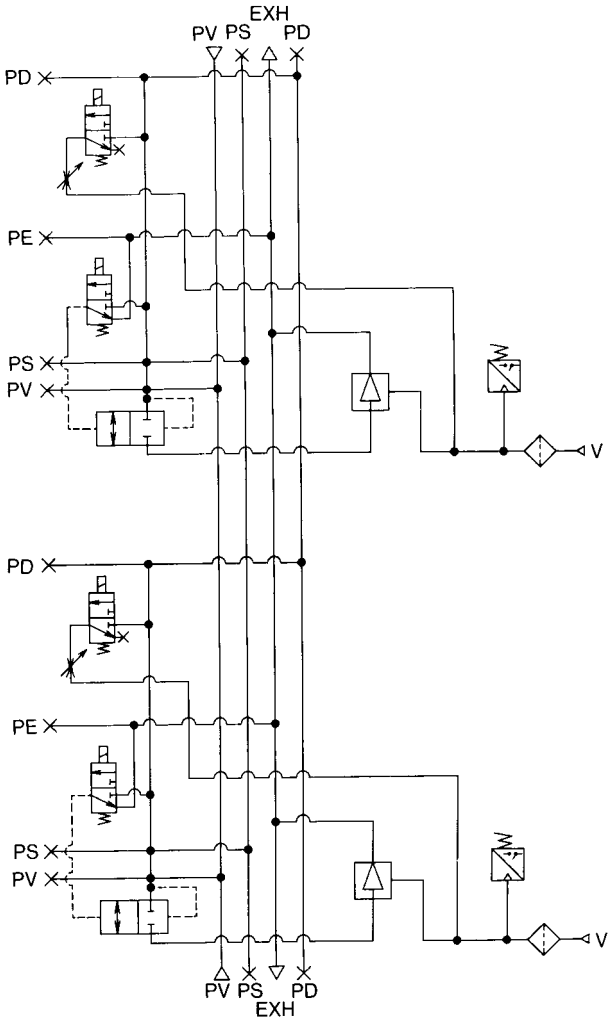
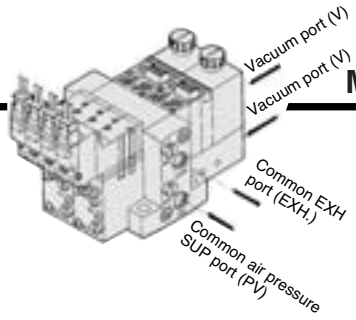
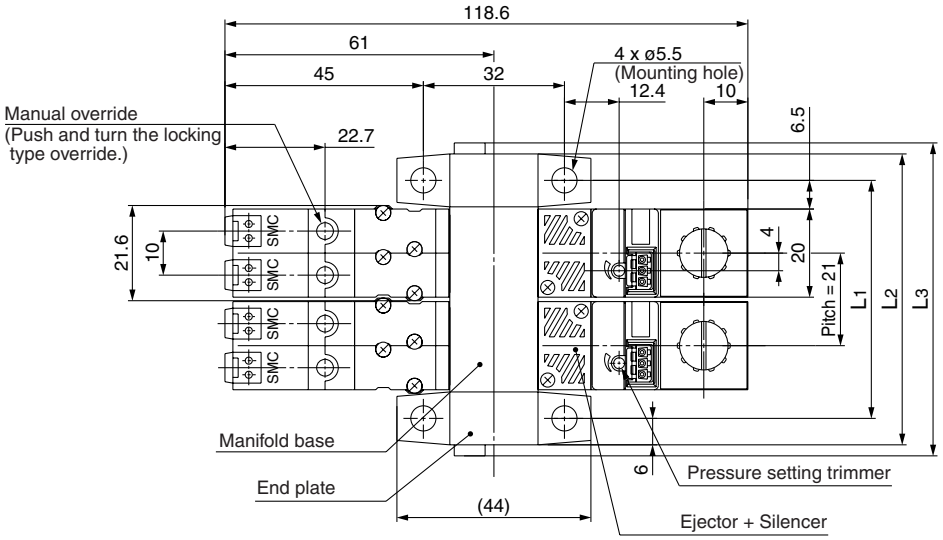


Circuit diagram

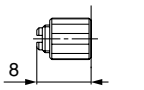


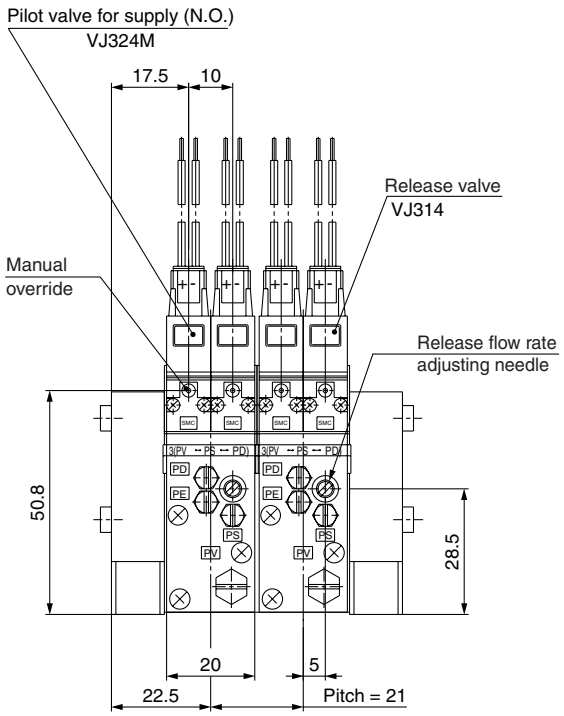
Ejector System — Manifold: Type K3

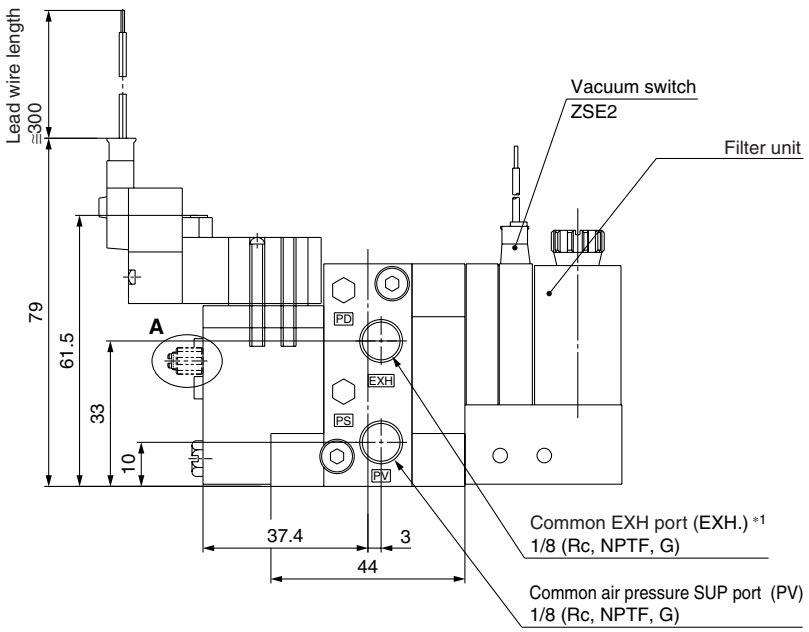




A: Release flow rate adjusting needle with lock nut







*1 The common exhaust port (EXH.) is also used as the pilot pressure exhaust (PE) port of pilot valve. Use while the port is open to the atmosphere.

(mm)

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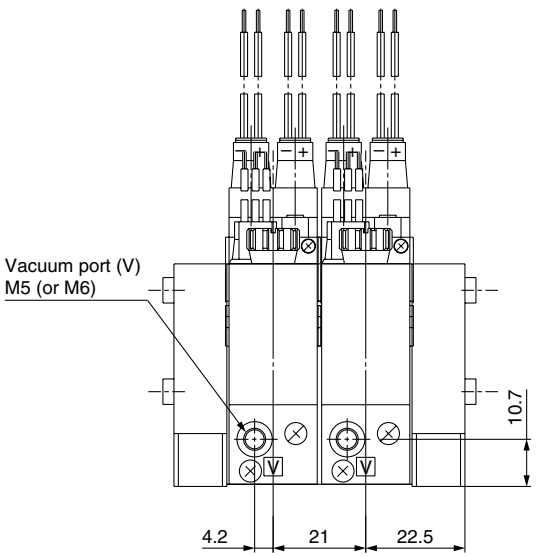
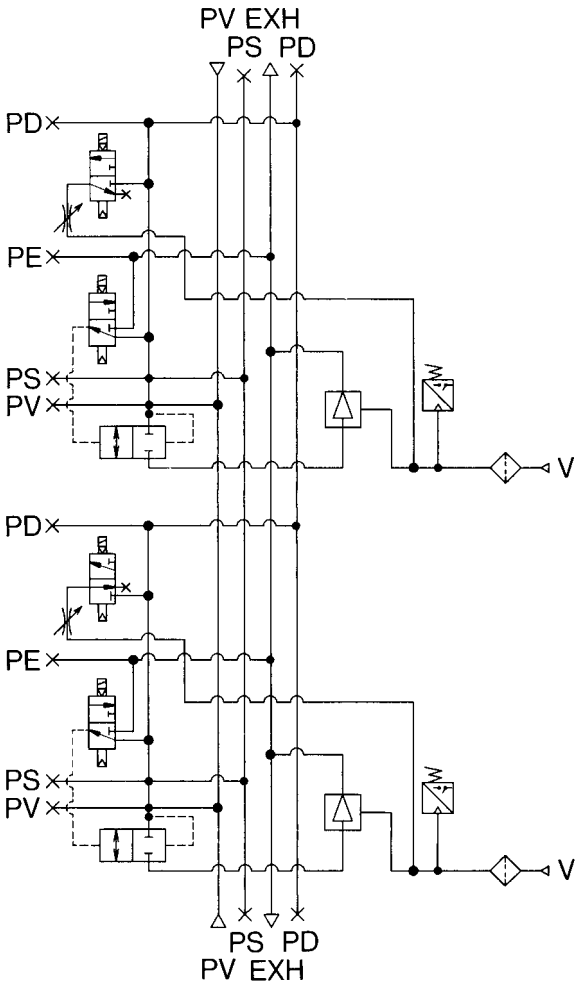


Circuit diagram



Vacuum Module:
Vacuum Pump System
Series ZX

Note) Refer to "How to Order" for CE compliant products. **[Option]**

How to Order

Components

Valve unit N.C. type	Vacuum switch unit
Valve unit N.O. type	Vacuum switch unit
Valve unit N.C. type	Filter unit

	Combination of supply valve and release valve	Pilot valve	Solenoid valve rated voltage	Electrical entry	Light/Surge voltage suppressor	Manual operation	Vacuum switch unit / Filter unit	Vacuum switch Electrical entry	PV/V port size	Release flow rate adjusting needle	
ZX100 —	K1		5	L	Z		E	C		L	
ZX100 —	K3		5	L	Z		E	C			
ZX100 —	K1		5	L	Z		F				

Valve unit/Combination of supply valve and release valve
Refer to "Table (1)" on page 903.

Pilot valve

Nil	DC: 1 W (With indicator light: 1.05 W)
	AC
Y*	DC: 0.45 W (With indicator light: 0.5 W)

* Only 24 VDC and 12 VDC are applicable to 0.45 W.

Solenoid valve rated voltage

		CE compliant
1* Note)	100 VAC 50/60 Hz	—
3* Note)	110 VAC 50/60 Hz	—
5	24 VDC	●
6	12 VDC	●
V	6 VDC	●
S	5 VDC	●
R	3 VDC	●
Nil	Air operated (K6, K8, J3, J4, D3, D4)	—

Note) CE compliant products are not available for "1" and "3".
* Applicable to plug connector only. (Connector assembly with rectifier is attached.)

Electrical entry

L	L plug connector type	Lead wire length 0.3 m
LN		Without lead wire (Applicable to DC only)
LO		Without connector
M	M plug connector type	Lead wire length 0.3 m
MN		Without lead wire (Applicable to DC only)
MO		Without connector
G	Grommet type	Lead wire length 0.3 m (Applicable to DC only)
H		Lead wire length 0.6 m (Applicable to DC only)
Nil	Air operated	

Note) In the case of "K1" (combination of supply and release valves), M type plug connector can not be used.

- Refer to "Table (2)" on page 903 for part number of lead wire with connector.
- Refer to page 916 for ordering the manifold.
- Refer to pages 926 and 927 for ordering a unit for replacement.

Manual operation

Nil	Non-locking push type
B	Locking slotted type

Light/Surge voltage suppressor

Nil	None
Z	With light/surge voltage suppressor
S*	With surge voltage suppressor

* S is not available for AC. DC voltage (with surge voltage suppressor)
If the polarity is incorrect at DC (surge voltage suppressor), diode or switching element may be damaged.

CE compliant

Nil	—
Q	CE compliant

PV/V port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Release flow rate adjusting needle

Nil	Without lock nut
L	With lock nut

Vacuum switch electrical entry

Nil	Grommet type	Lead wire length 0.6 m
L		Lead wire length 3 m
C	Connector type	Lead wire length 0.6 m
CL		Lead wire length 3 m
CN		Without connector (Without lead wire)

• Refer to "Table (3)" on page 903 for part number of lead wire with connector.

Vacuum switch unit/Filter unit

				CE compliant
E	Vacuum switch (For general purpose)(ZSE2)(NPN)		With suction filter	●
E55	Vacuum switch (For general purpose)(ZSE2)(PNP)			●
PS Note)	Adsorption confirmation switch (ZSP1)	Nozzle dia. (ø0.3 to 0.7)		—
PB Note)		Nozzle dia. (ø0.5 to 1.2)		—
F	Only suction filter			● Except air operated parts

Note) CE compliant products are not available for "PS" and "PB".

Vacuum digital pressure switch unit (ZSE3)

D	21	2 outputs/without analog output
	22	2 outputs/with analog output
	23	1 output (with trouble detection)/without analog output
	24	1 output (with trouble detection)/with analog output

Note) Analog output is available on grommet type only.

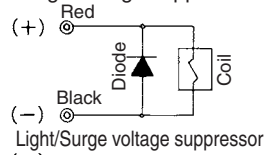
⚠ Caution

When using the AC type, the DC solenoids are operated via a rectifier. Therefore, when using this type, make sure to combine the connector assembly equipped with a rectifier with the exclusive solenoids. Using other combinations could lead to burned coils or other types of malfunctions.

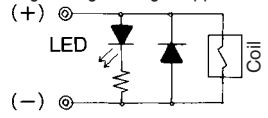
The filter mounted on the product is a simplified one. When used in an environment with a lot of dust, the filter is likely to be clogged quickly. The use with the series ZFA, ZFB and ZFC is recommended.

⚠ Caution

Surge voltage suppressor



Light/Surge voltage suppressor



Using the DC type:
Match the polarity of the connectors according to the ⊕ and ⊖ marks on the connectors. Do not interchange the polarities to prevent the diodes or the switching elements from becoming burned.
If lead wires are pre-connected, the red wire is ⊕ and the black wire is ⊖.

Using the AC type:
The AC type is not equipped with a surge voltage suppressor because the rectifier assembly prevents the generation of surge voltage.

SMC

Table (1) Valve Unit/Combination of Supply Valve and Release Valve

(Refer to page 904 for details specifications.)

Components		Symbol	Supply valve					Release valve					Mass (g)
			Solenoid valve		Air operated		None	Solenoid valve		Air operated	External release	None	
Supply valve	Release valve		N.C. (VJ114)	N.O. (VJ324)	N.C. (ZX1A)	N.O. (VJA324)		N.C. (VJ114)	N.C. (VJ314)	N.C. (VJA314)	ZX1A		
Solenoid (N.C.)	Solenoid (N.C.)	**K1**	●	—	—	—	—	●	—	—	—	—	82
Solenoid (N.O.)	Solenoid (N.C.)	**K3**	—	●	—	—	—	—	●	—	—	—	132
Air operated (N.C.)	External release	**K6**	—	—	●	—	—	—	—	—	●	—	58
Air operated (N.O.)	Air operated (N.C.)	**K8**	—	—	—	●	—	—	—	●	—	—	132
—		**Nil**	Without valve module										

Table (2) Valve Unit/Valve Plug Connector Assembly

Connector assemby part no.

(For DC)
VJ10-20-4A-6

(For 100 VAC)
VJ10-36-1A-6

(For 110 VAC)
VJ10-36-3A-6

Lead wire length

Nil	0.3 m (Standard)
6	0.6 m
10	1 m
15	1.5 m
20	2 m
25	2.5 m
30	3 m

How to order

If ordering vacuum module with 600 mm or the longer lead wire, specify both vacuum module and connector assemby part numbers.

(Ordering example)
ZX100-K15LOZ-EC(-Q) ····· 1 pc.
∗VJ10-20-4A-6 ····· 2 pcs.
→ The asterisk (∗) denotes the symbol for assembly.

Table (3) Vacuum Switch/Plug Connector Assembly

For ZSE2
For ZSP1 **ZS-10-5A-**□

For ZSE3 **ZS-20-5A-**□

Lead wire length

Nil	0.6 m
30	3 m
50	5 m

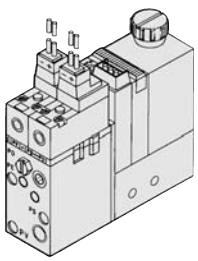
Note) If ordering switch with 5 m lead wire, specify both switch and lead wire connector part numbers.

Ordering example)
ZX100-K150Z- ECN(-Q) ····· 1 pc.
∗VJ10-20-4A-6 ····· 2 pcs.
∗ZS-10-5A-50 ····· 1 pc.
→ The asterisk (∗) denotes the symbol for assembly.

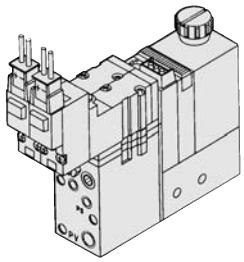
Ejector System/Recommended Model (The models below are for express delivery.)

Model	Combination		Solenoid valve rated voltage	Lead wire electrical entry	Light/Surge voltage suppressor	Vacuum switch unit /Filter unit	Vacuum switch electrical entry
	Supply valve (Pilot valve)	Release valve (Direct operated)					
ZX100-K15LZ-F	N.C. (VJ114)	N.C. (VJ114)	24 VDC	Plug connector type	With light/surge voltage supressor	Suction filter (ZX1-F)	Connector type
ZX100-K15LZ-EC	N.C. (VJ114)	N.C. (VJ114)				Vacuum switch (ZSE2)	
ZX100-K35MZ-EC	N.O. (VJ324M)	N.C. (VJ314)					

∗The above models are for express delivery.



ZX100-K15LZ-E□

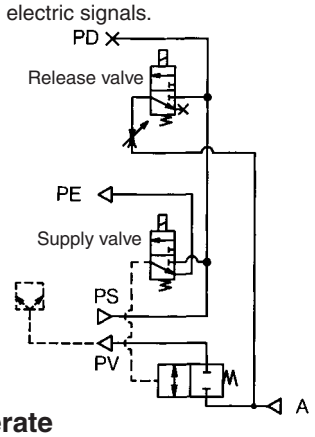


ZX100-K35MZ-E□

Vacuum Pump System/Combination of Supply Valve and Release Valve

Combination Symbol: K1

Application: This combination is used for effecting control in accordance with electric signals.

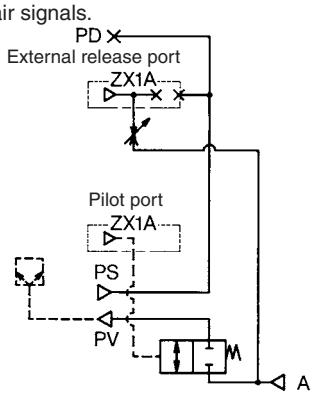


How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K6

Application: This combination is used for effecting control in accordance with air signals.

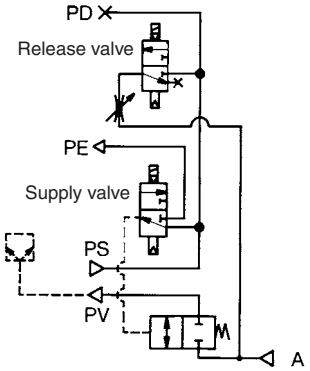


How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K3

Application: This combination is used for effecting control in accordance with electric signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

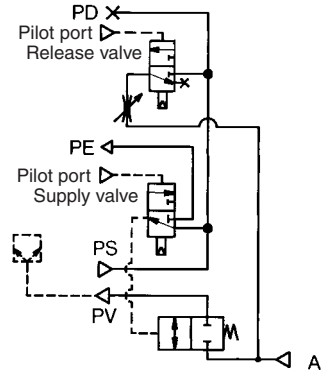


How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	Solenoid valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: K8

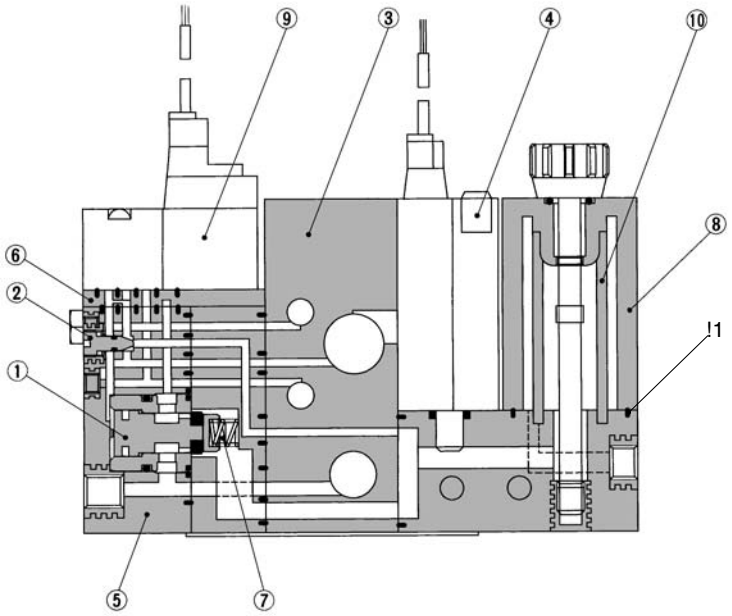
Application: This combination is used for effecting control in accordance with air signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This type is used for preventing the workpieces from dropping during power outages.



How to Operate

Valve / Condition	Supply valve	Release valve
	Air operated valve	Air operated valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Vacuum Pump System/Construction



Component Parts

No.	Description	Material	Note
1	**Poppet valve assembly**	—	ZX1-PV-0
2	**Release flow rate adjusting needle**	Stainless steel	
3	**Manifold base**	Aluminum	
4	**Vacuum switch**	—	ZSE2, ZSP1, ZSE3
5	**Valve unit**	—	ZX1-VB□□□□□□□-D-□
6	**Interface plate**	—	(PV)/(PS↔PD)
7	**Return spring**	Stainless steel	
8 Note)	**Filter case**	Polycarbonate	

Replacement Parts

No.	Description	Material	Part no.
9	**Pilot valve**	—	Refer to "Table (2)", "(3)".
10	**Filter element**	PVF	ZX1-FE
11	**Gasket**		ZX1-FG

Note) Caution when handling filter case
1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, watersoluble cutting oil (alkalinic), etc.
2. Do not expose it to direct sunlight.

Table (1) How to Order Pilot Valves

No.	Component equipment		Model	Combination of supply and release valve
	Supply valve	Release valve		
1	Solenoid valve N.C. (VJ114)	Solenoid valve N.C. (VJ114)	**ZX1-VJ114-□□□□**	K1, J1
2	Solenoid valve N.O. (VJ324)	Solenoid valve N.C. (VJ314)	**ZX1-VJ3$^{1}_{2}$4□-□□□□**	K3, J2
3	Air operated N.O. (VJA324)	Air operated N.C. (VJA314)	**ZX1-VJA3$^{1}_{2}$4**	K6
4	Solenoid valve	Air operated	No. 2 and 3 models only are applicable. Indicate each part number.	
	Air operated	Solenoid valve		

Table (3) How to Order Air Operated Valves

ZX1A−M3

Port size

M3	M3 x 0.5	Pilot port/External release port
M5	M5 x 0.8	

Table (2) How to Order Solenoid Valves

ZX1-VJ114 □-5LZ□

ZX1-VJ32 4 □□-5LZ□

Type of actuation

1	N.C. (Normally closed)
2	N.O. (Normally open)

Body option

Nil	Pilot valve Individual exhaust
M	Common exhaust for main and pilot valves

Note) In the case of N.C. type, indicate no symbol. (Individual exhaust for Pilot valve)

Note) Compatible with ZX1-VJ324M-□ and ZX1-VJ314-□ only.

Pilot valve

Nil	DC: 1 W (With indicator light: 1.05 W)
	AC
Y *	DC: 0.45 W (With indicator light: 0.5 W)

Rated voltage

1 *	100 VAC
3 *	110 VAC
5	24 VDC
6	12 VDC
V	6 VDC
S	5 VDC
R	3 VDC

*Applicable to plug connector

Electrical entry

L	Connector (0.3 m)
LN	Connector (W/o lead wire)
LO	Without connector
M	Connector (0.3 m)
MN	Connector (W/o lead wire)
MO	Without connector
G	Grommet (0.3 m)
H	Grommet (0.6 m)

Note) In the case of ZX1-VJ114, M, MN and MO cannot be used.

Manual override

Nil	Non-locking push type
B	Locking slotted type

Light/Surge voltage suppressor

Nil	Without light/surge voltage suppressor
S	With surge voltage suppressor
Z	With light/surge voltage suppressor

* 24 VDC and 12 VDC are applicable to 0.45 W.

Note) Screw length of VJ100 and VJ300 for series ZX is different from that of the standard model.
<Screw length> VJ100–M1.7 x 15
VJ300–M1.7 x 22

⚠ Caution

Turning the vacuum release flow volume adjusting needle clockwise reduces the vacuum release flow volume; the needle valve is fully closed when the needle stops turning. Turning the needle 2 full turns counterclockwise from the fully closed position renders the needle valve fully open. The needle will fall out if it is turned more than 4 full turns.
In order to prevent the needle from loosening and falling out, a special product is also available.

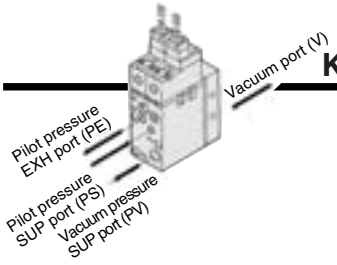
Valve Unit: ZX1-VB

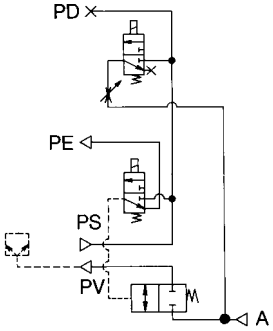
Refer to page 872 for details.

Model/Specifications

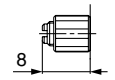
Unit no.	ZX1-VB□□□□□-□							
Components	Supply valve				Release valve			
Operation	Pilot type				Direct operated type			
	Solenoid valve		Air operated		Solenoid valve		External release	Air operated
	N.C. (VJ114)	N.O. (VJ324)	N.C. (ZX1A)	N.O. (VJA324)	N.C. (VJ114)	N.C. (VJ314)	(ZX1A)	(VJA314)
Cv factor	0.17				0.008	0.08	—	
Operating pressure range	0.3 to 0.6 MPa							
Max. operating frequency	5 Hz							
Operating temperature range	5 to 50°C							
Interface plate symbol	(PV)•(PS ↔ PD)							
Standard accessory	Bracket B (ZX1-OBB)							

K1 (Normally closed)

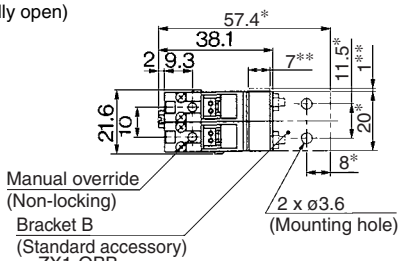


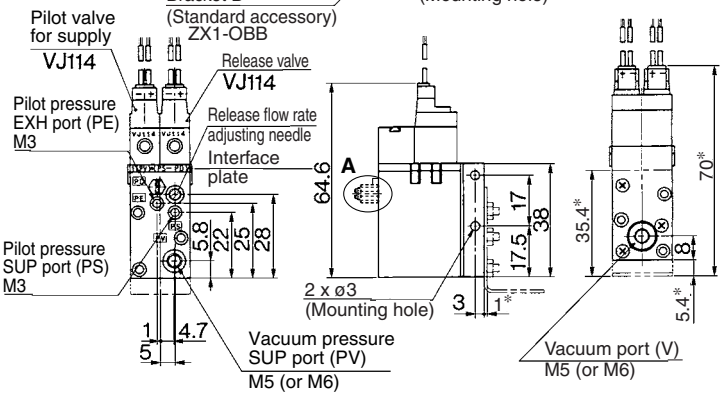


A: Release flow rate adjusting needle with lock nut

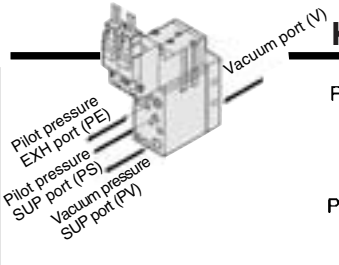


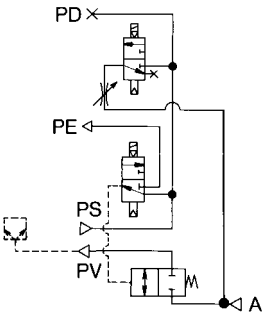
(Needle fully open)

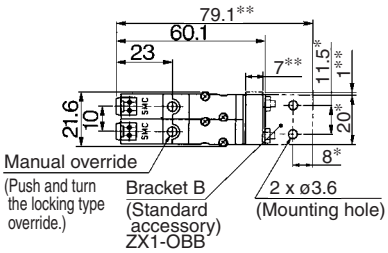


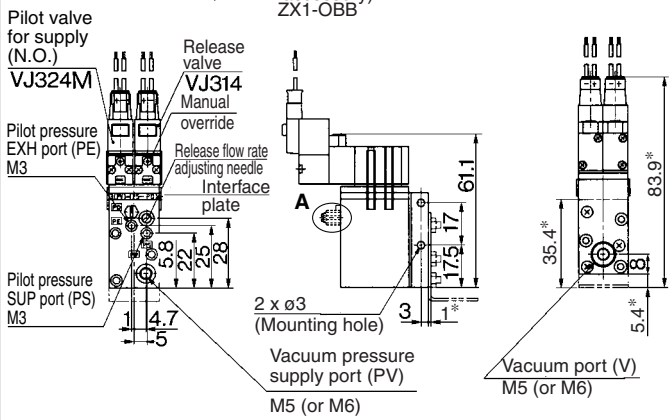


K3 (Normally open)









Note) Dimensions ∗: For mounting bracket B ∗∗: For mounting spacer

Suction Filter Unit: ZX1-F

Refer to page 874 for details.

Specifications

Unit no.	ZX1-F
Operating pressure range	Vacuum to 0.5 MPa
Operating temperature range	5 to 50°C
Filtration efficiency	30 μm
Filter media	PVF
Mass	35 g
Standard accessory	Bracket A (ZX1-OBA)

Note) If not operated within the specified range of pressure and temperature, trouble may be caused.

Vacuum Pressure Switch Unit/ZSE2, ZSE3, ZSP1

Refer to pages 875 to 880 for details.

Vacuum Pressure Switch

High speed response/10 ms

Uses a carrier diffusion semiconductor pressure sensor

Vacuum Pressure Switch Specifications

Refer to Best Pneumatics Vol.6 for details.

Unit no.	ZSE2-0X	ZSE3-0X
Fluid	Air	
Set pressure range	0 to –101 kPa	
Hysteresis	3% Full span or less	
Repeatability	±1% Full span or less	
Temperature characteristics	±3% Full span or less	
Voltage	12 to 24 VDC (Ripple ±10% or less)	
Port size	M5 x 0.8, M6 x 1 (Option)	

Note) If not operated within the specified range of pressure and temperature, trouble may be caused.

Adsorption Confirmation Switch

Suitable for small size adsorption nozzle/ø0.3 to ø1.2

With suction filter

Improved wiring: connector type

Uses a carrier diffusion semiconductor pressure sensor

Adsorption Confirmation Switch Specifications

Unit no.	ZSP1-S	ZSP1-B
Fluid	Air	
Operating pressure range	–20 to –101 kPa	
Applicable adsorption nozzle dia.	0.3 to 0.7 mm	0.5 to 1.2 mm
Hysteresis	0.5 kPa	
Internal orifice	0.5 mm	0.8 mm

• Filter case

⚠ Caution

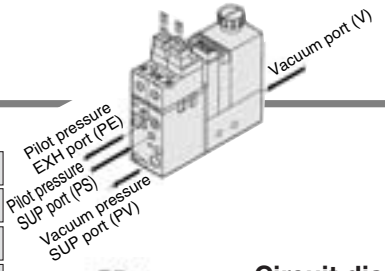
1. The case is made of polycarbonate. Therefore, do not use it with or expose it to the following chemicals: paint thinner, carbon tetrachloride, chloroform, acetic ester, aniline, cyclohexane, trichloroethylene, sulfuric acid, lactic acid, water-soluble cutting oil (alkalinic), etc.
2. Do not expose it to direct sunlight.

• Other caution

⚠ Caution

It might not be possible to successfully pick a workpiece if a picking nozzle or a picking pad that is out of the applicable range is used.

Valve Unit: Type K1



Configuration and combination

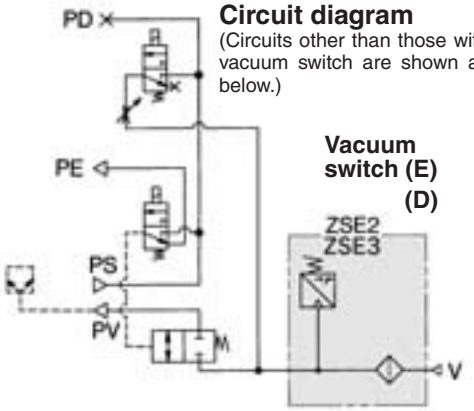
Valve unit (K1) + Vacuum switch (ZSE2) / Vacuum switch (ZSE3) / Adsorption confirmation switch (ZSP1) / Filter unit (F)

Model

ZX100 — K1□□□□ —

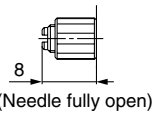
- **E□**
- **D□□□**
- **P□□**
- **F**

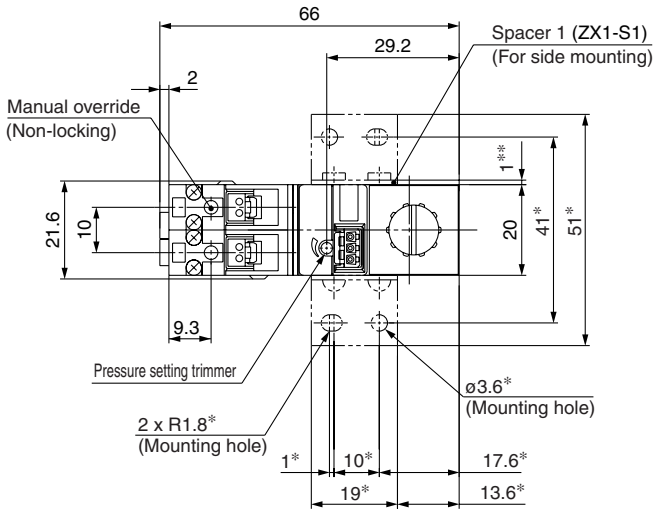
Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)



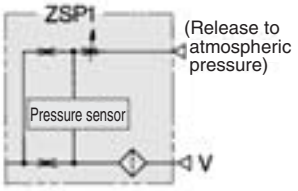
Vacuum switch (ZSE2)
ZX100-K1□□□-E□

A: Release flow rate adjusting needle with lock nut

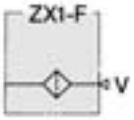


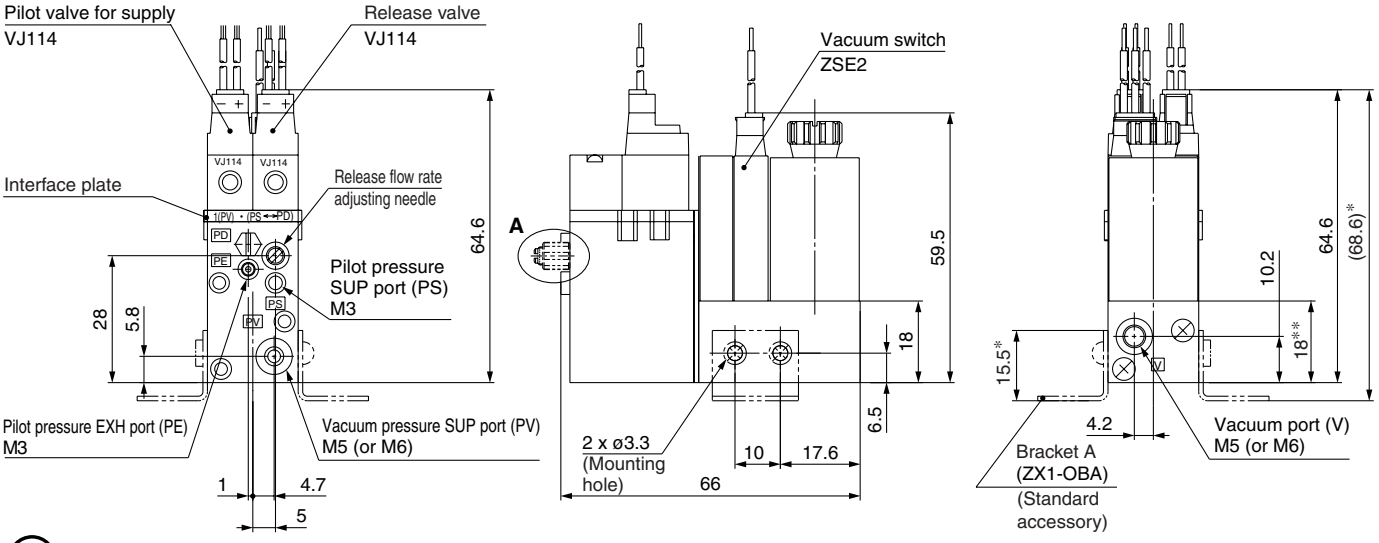


Adsorption confirmation switch (P)



Filter unit (F)

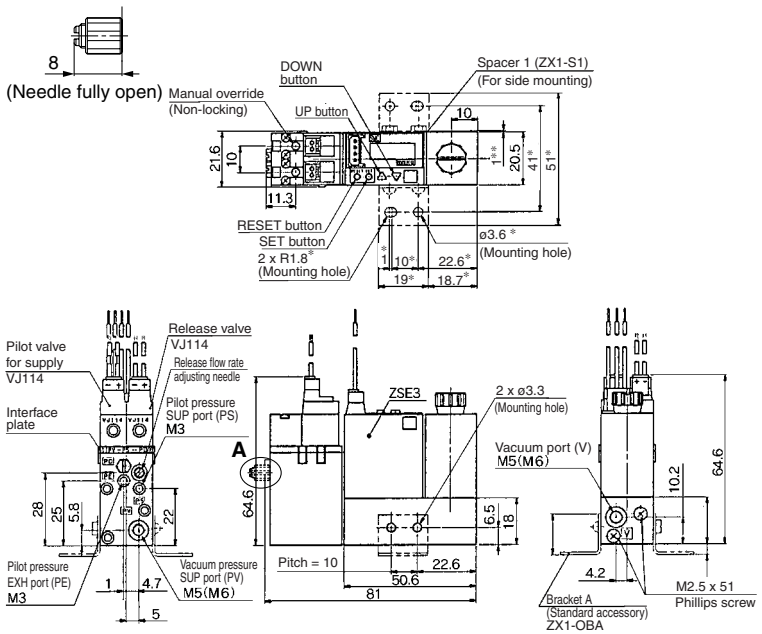




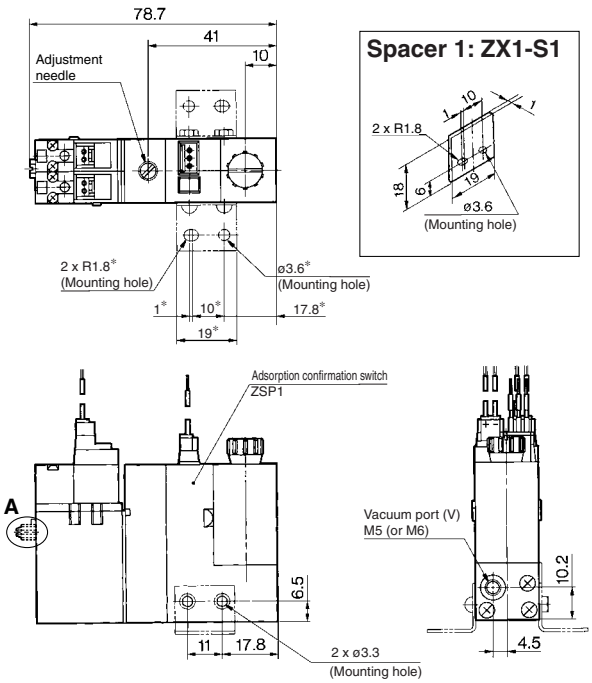
Note) Dimensions *: For mounting bracket A **: For mounting spacer 1.

Vacuum switch (ZSE3)
ZX100-K1□□□□-D□□

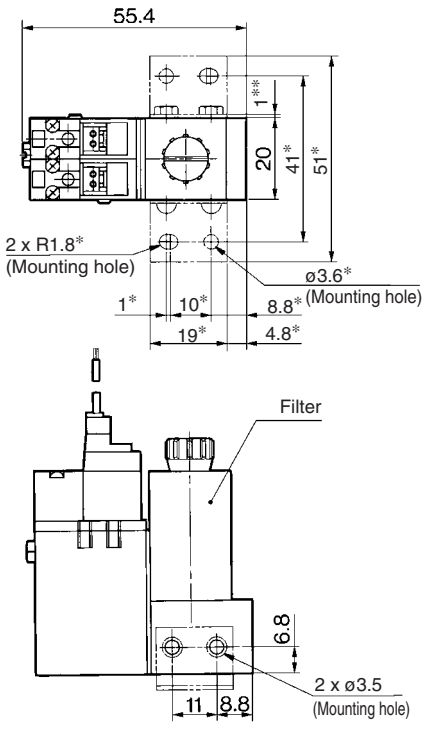
A: Release flow rate adjusting needle with lock nut



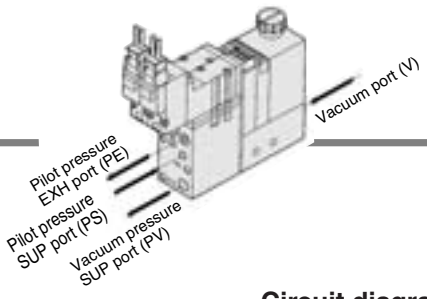
Adsorption confirmation switch (ZSP1)
ZX100-K1□□□□-P□□



Filter unit (F)
ZX100-K1□□□□-F



Valve Unit: Type K3



Configuration and combination

Valve unit (K3) +

- Vacuum switch (ZSE2)
- Vacuum switch (ZSE3)
- Adsorption confirmation switch (ZSP1)
- Filter unit (F)

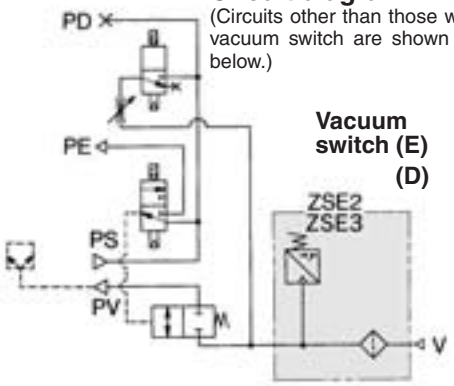
Model

ZX100 — K3□□□□ —

- E□
- P□□
- F
- D□□□

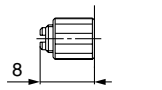
Circuit diagram

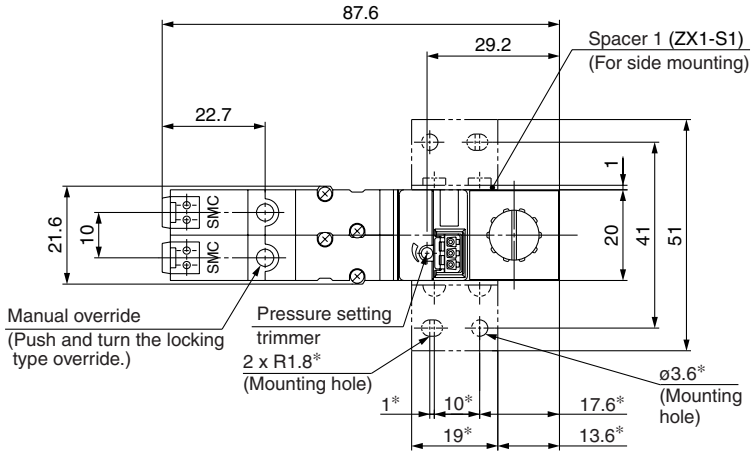
(Circuits other than those with vacuum switch are shown as below.)



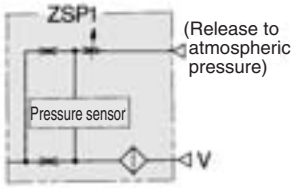
Vacuum switch (ZSE2)
ZX100-K3□□□-E□

A: Release flow rate adjusting needle with lock nut

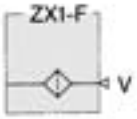


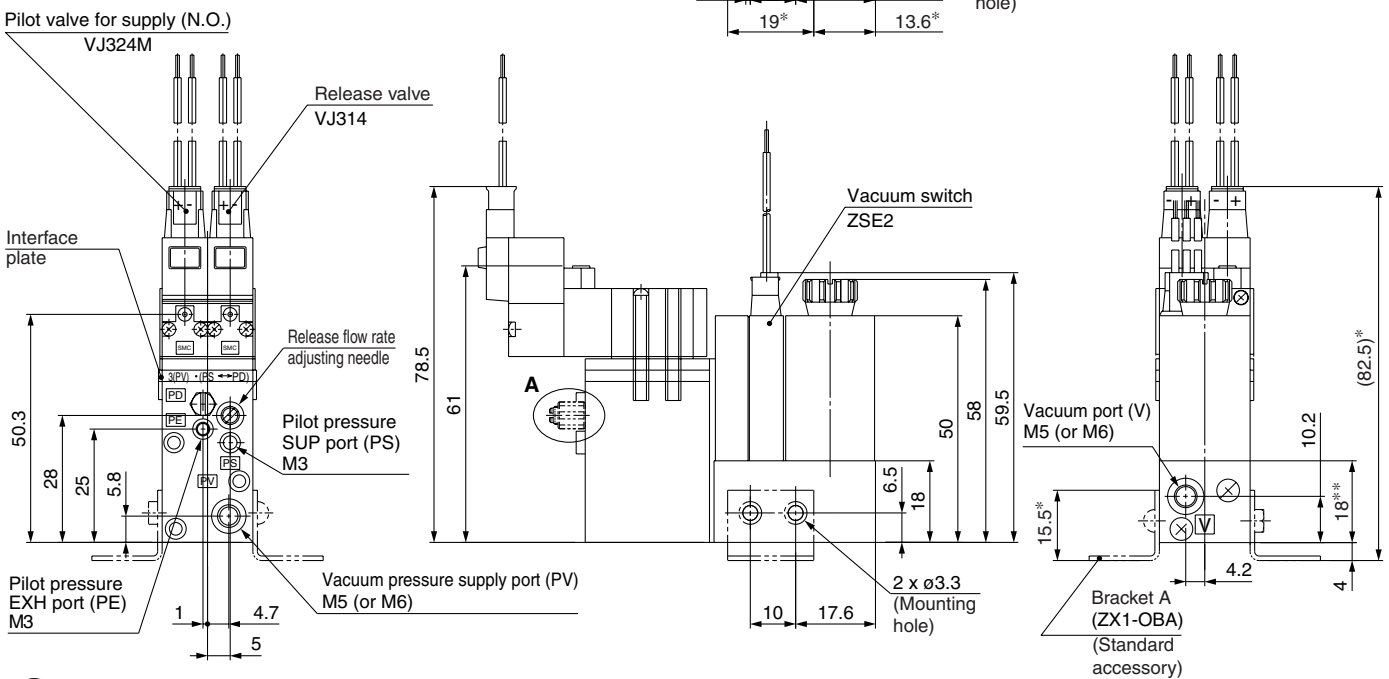


Adsorption confirmation switch (P)



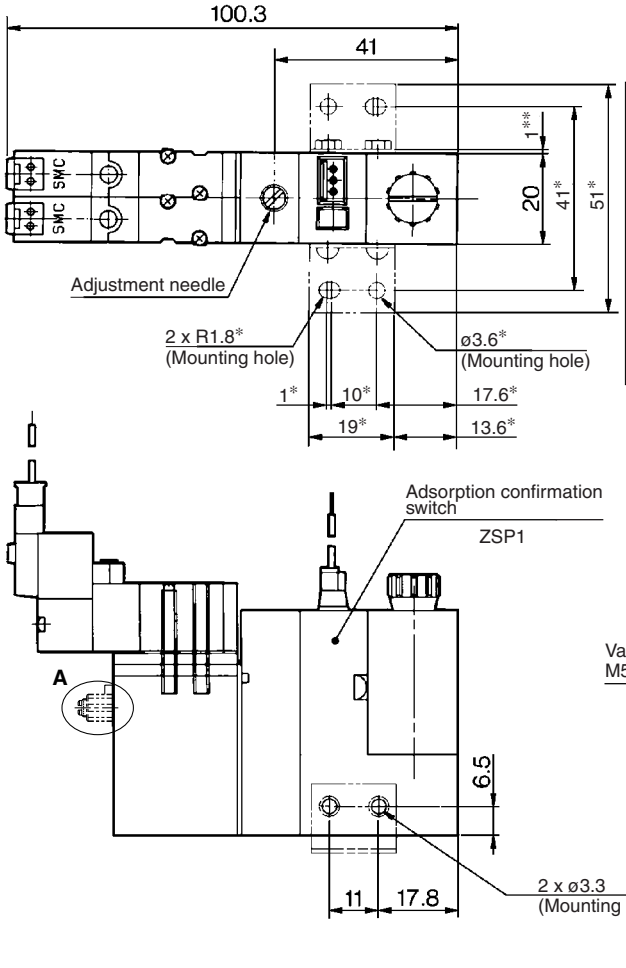
Filter unit (F)



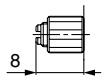


Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

Adsorption confirmation switch (ZSP1)
ZX100-K3□□□□-P□□

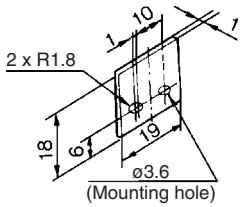


A: Release flow rate adjusting needle with lock nut

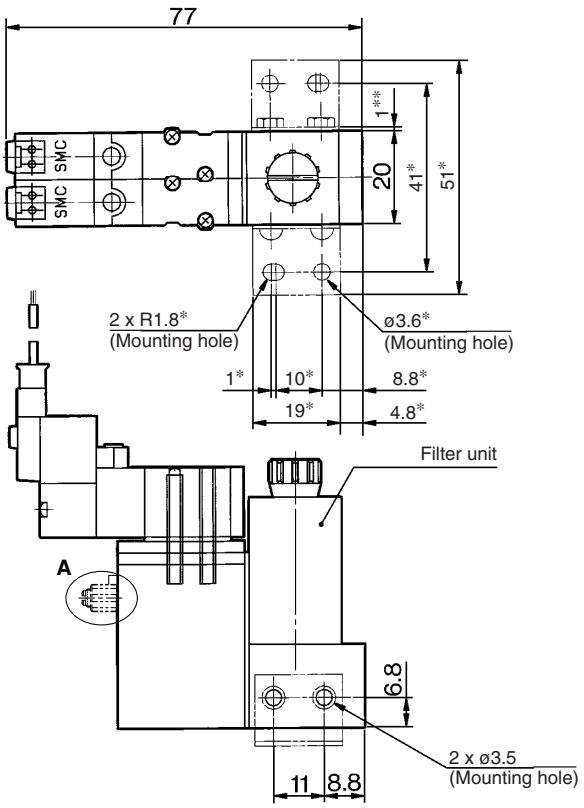


(Needle fully open)

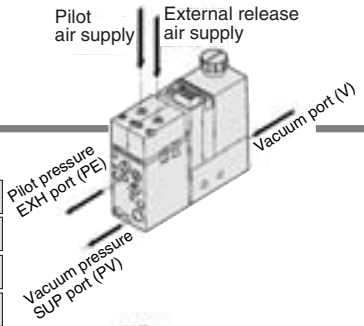
Spacer 1: ZX1-S1



Filter unit (F)
ZX100-K3□□□□-F



Valve Unit: Type K6



Configuration and combination

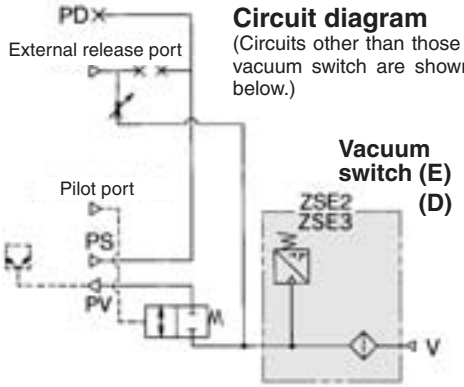
Valve unit (K6) +

- **Vacuum switch (ZSE2)**
- **Vacuum switch (ZSE3)**
- **Adsorption confirmation switch (ZSP1)**
- **Filter unit (F)**

Model

ZX100 — K6 —

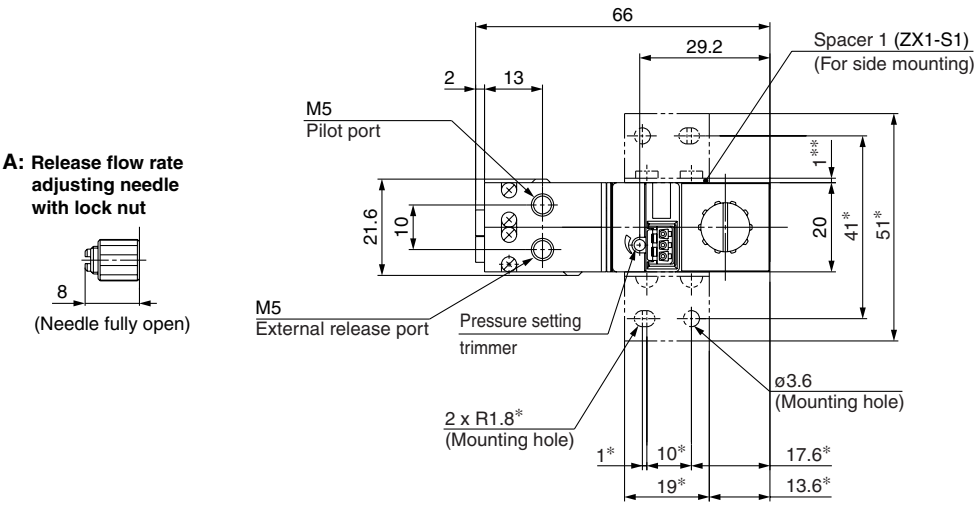
- **E□**
- **P□**
- **F**
- **D□□□**



Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

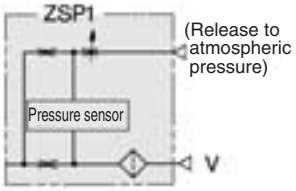
Vacuum switch (E) (D)

Vacuum switch (ZSE2) ZX100-K6-E□

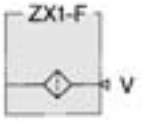


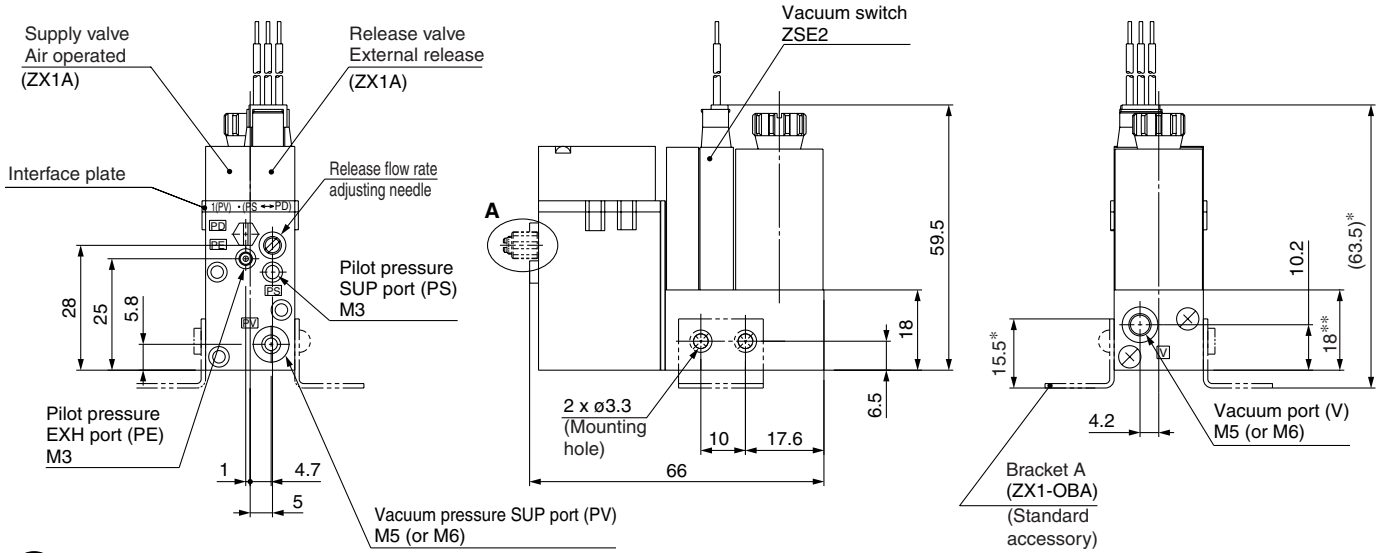
A: Release flow rate adjusting needle with lock nut

Adsorption confirmation switch (P)



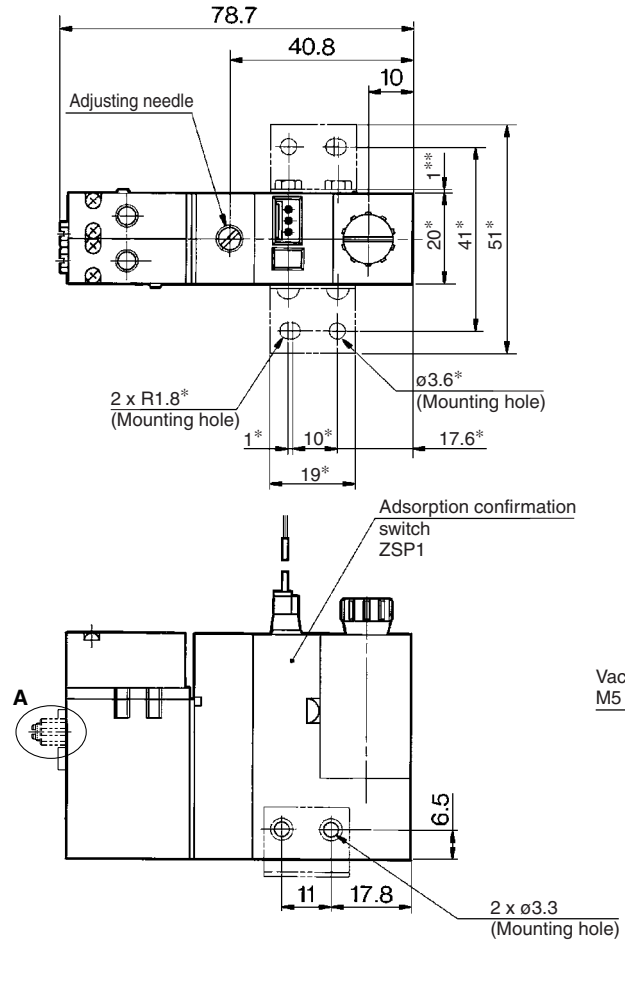
Filter unit (F)



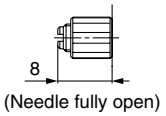


Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

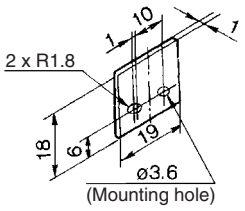
Adsorption confirmation switch (ZSP1) ZX100-K6-P□□

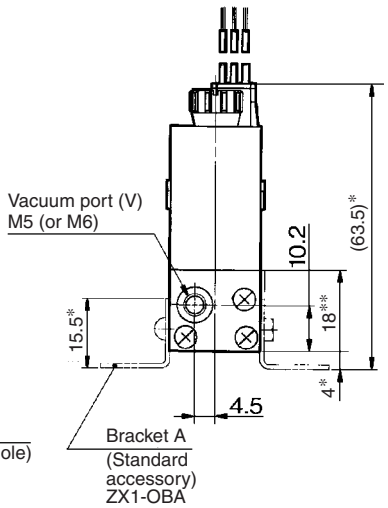


A: Release flow rate adjusting needle with lock nut

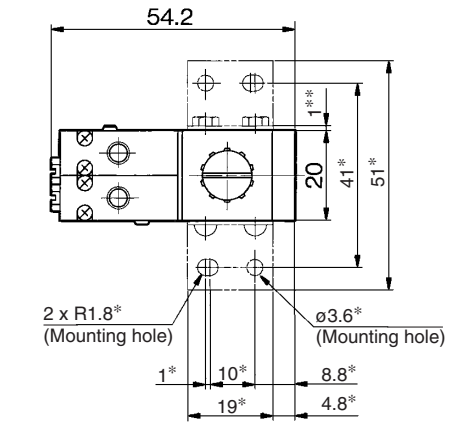


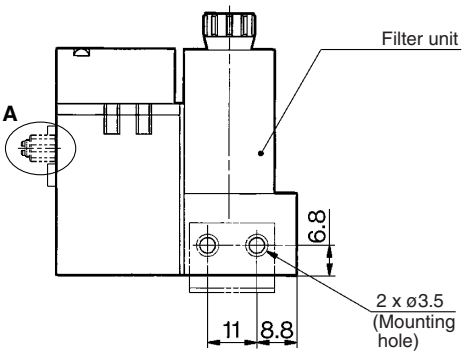
Spacer 1: ZX1-S1



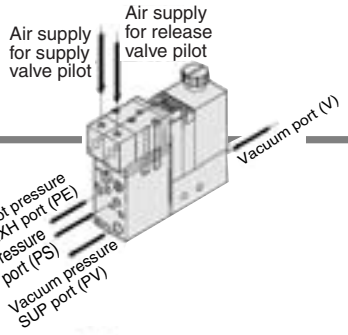


Filter unit (F) ZX100-K6-F





Valve Unit: Type K8



Configuration and combination

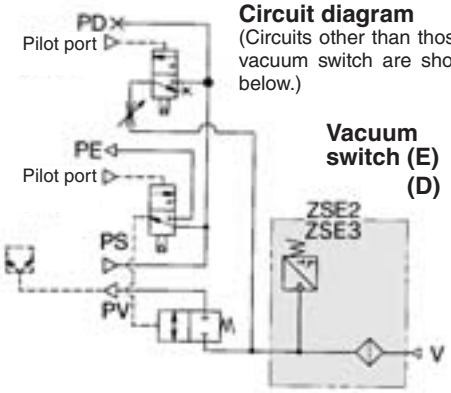
Valve unit (K8) +

- **Vacuum switch (ZSE2)**
- **Vacuum switch (ZSE3)**
- **Adsorption confirmation switch (ZSP1)**
- **Filter unit (F)**

Model
ZX100 — K8 —

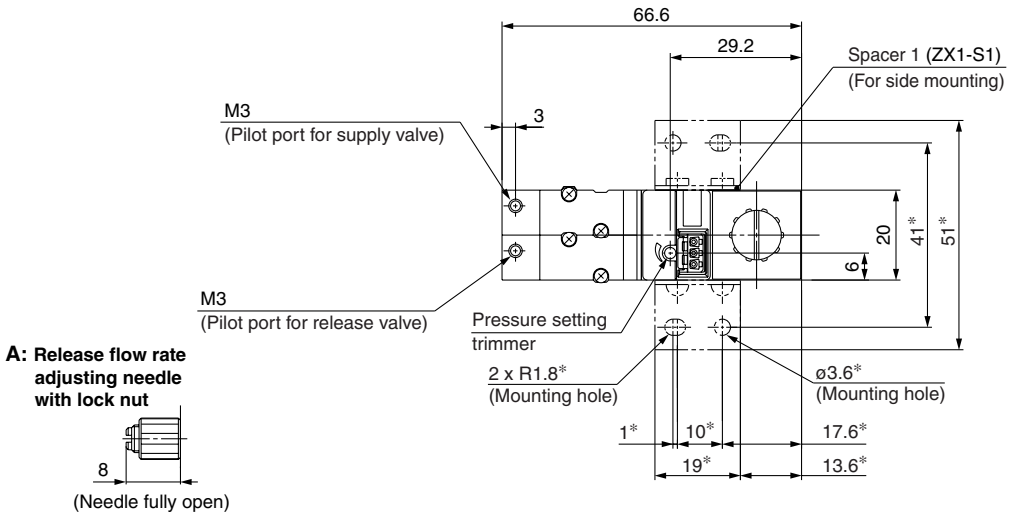
- **E□**
- **P□□**
- **F**
- **D□□□**

Circuit diagram
(Circuits other than those with vacuum switch are shown as below.)

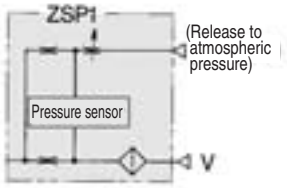


Vacuum switch (E) (D)

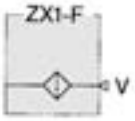
Vacuum switch (ZSE2) ZX100-K8-E□

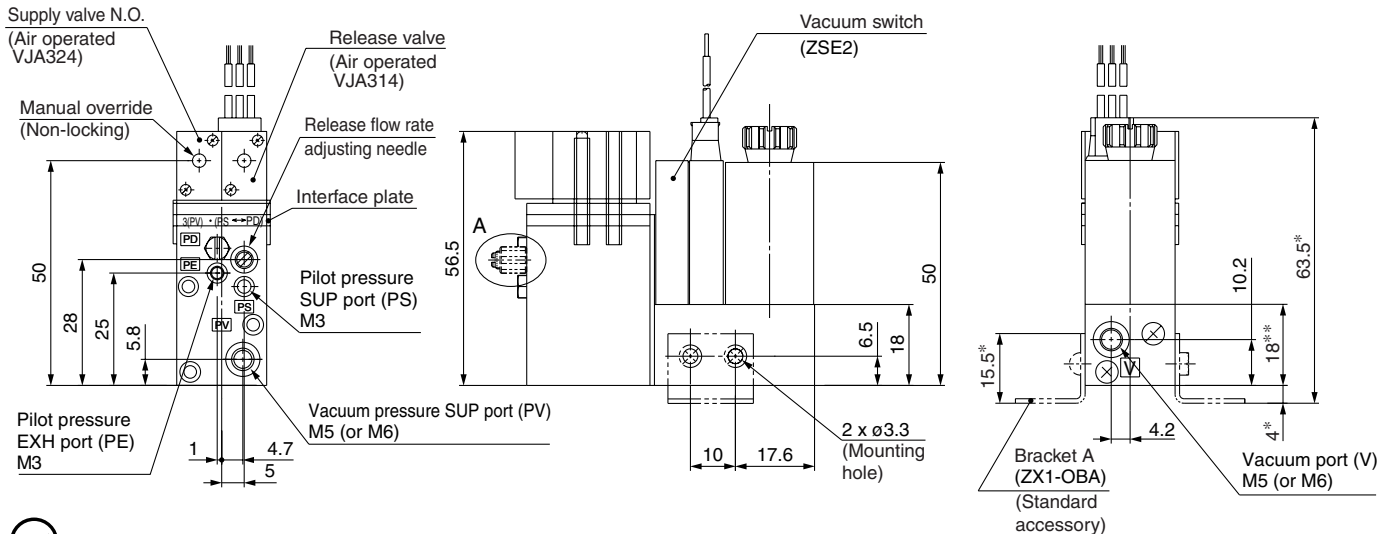


Adsorption confirmation switch (P)



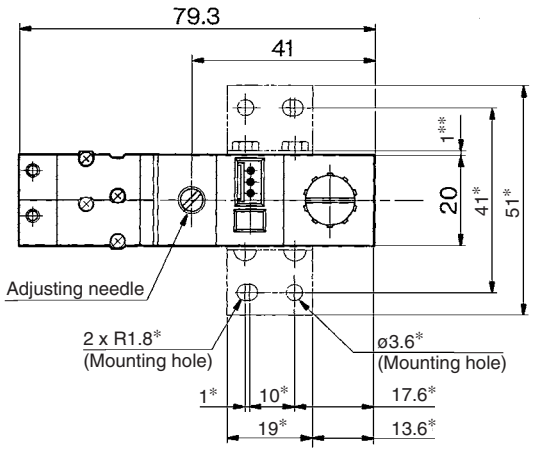
Filter unit (F)



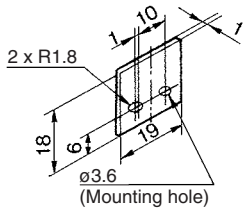


Note) Dimensions ∗: For mounting bracket A ∗∗: For mounting spacer 1.

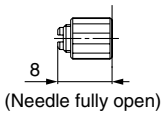
Adsorption confirmation switch (ZSP1)
ZX100-K8-P□□

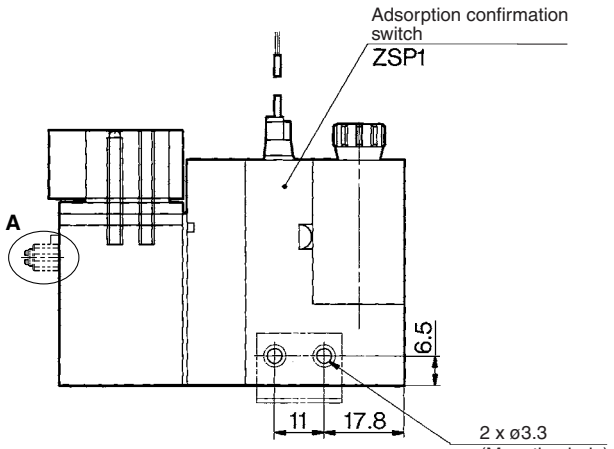


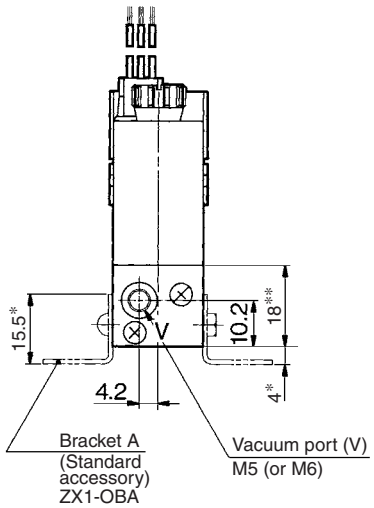
Spacer 1: ZX1-S1



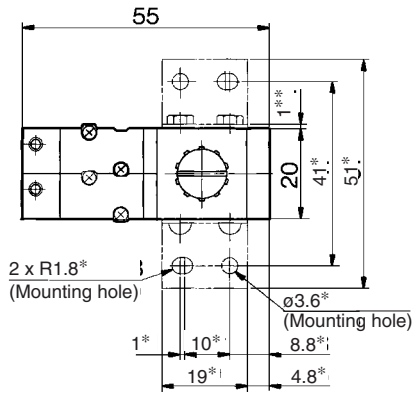
A: Release flow rate adjusting needle with lock nut

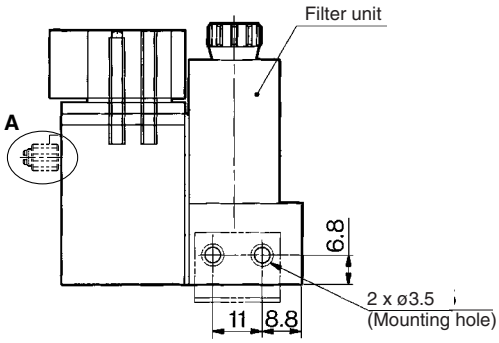




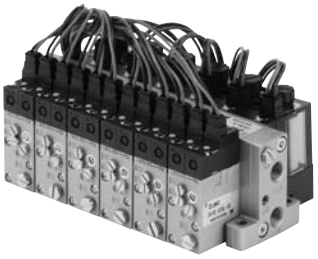


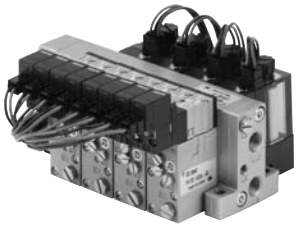
Filter unit (F)
ZX100-K8-F





Vacuum Pump System/Manifold Specifications





Specifications

Max. number of units		Max. 8 units
Port size	**Supply port [PV]**	1/8 (Rc, NPTF, G)
	Exhaust port [EXH]	1/8 (Rc, NPTF, G)
Mass		1 station: 73 g (50 g per additional station)

Note 1) PD port: Blank
Note 2) Vacuum from both sides of PV port for 6 or more stations of ZX100 external vacuum pump manifold.

Air Supply

Manifold / Port / Supply port location	Left side		Right side	
	PV	**PS**	**PV**	**PS**
L (Left)	○	○	●	●
R (Right)	●	●	○	○
B (Both sides)	○	○	○	○

○: Vacuum supply from PV port ○: Air supply from PS port
●: Plugged

Note) All ports for each valve unit are provided with plugs.

How to Order Manifold

<Manifold base>

ZZX1 06 – ☐ R

Stations

01	1
02	2
⋮	⋮
08	8

Thread of supply and exhaust valve

Nil	Rc
F	G Note)
T	NPTF

Note) G thread
The thread ridge shape is compatible with the G thread standard (JIS B0202), but other shapes are not conforming to ISO16030 and ISO1179.

Supply port location

Symbol	Supply port location *1	Air Supply	
		Vacuum supply	Air supply
R	Right side	PV port on the right side	PS port on the right side
L	Left side	PV port on the left side	PS port on the left side
B	Both sides	PV port on both sides	PS port on both sides

∗ 1 Viewed from the front side of valve unit, confirm the port location on the right and/or left side.
∗ 2 EXH ports are released to atmospheric pressure in both sides. Plugs are always attached to PD ports and all ports of the valve unit.

(Ordering example)
ZZX106-R ·····1 pc. (Manifold base)
∗ZX100-K15LZ-EC(-Q)
·····5 pcs. (Vacuum single unit)
∗ZX1-BM1
·····1 pc. (Blank plate)

<Individual spacer>

Specify the individual spacer when separating the supply and exhaust ports of the manifold ejector.

ZX1 – R1 – 1

Individual spacer

R1
⋮
R16

∗Refer to the individual spacer.

(Ordering example)
If installed on station 1 and station 3:
ZZX106-R ·····1 pc.
∗ZX100-K15LZ-EC(-Q)
·····6 pcs.
∗ZX1-R1-1
∗ZX1-R1-3
∗ZX1-R16 (Dummy spacer)
·····4 pcs.

Arrangement
(First station from the right end of the valve side is station 1.)

Nil	All stations
1	Station 1 only
⋮	⋮
8	Station 8 only

∗When spacers are mounted alternately, specify them together.
∗When retrofitting, 3 pcs. of M2.5 x 32 (for ZX) are necessary. A dummy spacer (ZX1-R16) must be mounted on the stations on which individual spacers are not mounted.

About individual spacers

- Manifold supply or valve unit supply can be selectable for each port. In the table below, ports with the symbol ↕ mean that they are manifold supply, while others are individual supply from the valve unit.
- Symbols in the table below are printed on the surface of individual spacers.

Part no.	Symbol
ZX1-R1	R1
R2	R2 ↕PE
R3	R3 ↕PD
R4	R4 ↕PD ↕PE
R5	R5 ↕PS
R6	R6 ↕PS ↕PE
R7	R7 ↕PS ↕PD
R8	R8 ↕PS ↕PD ↕PE

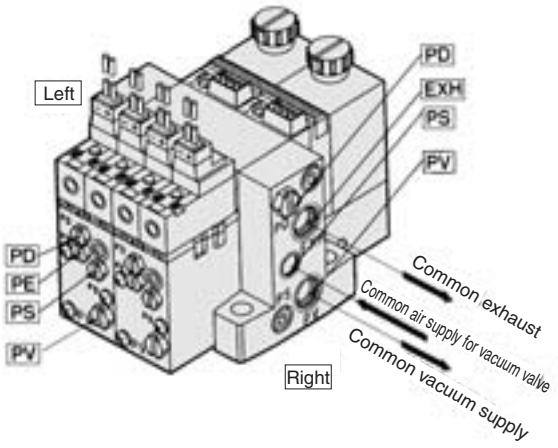
Part no.	Symbol
ZX1-R 9	R 9 ↕PV
R10	R10 ↕PV ↕PE
R11	R11 ↕PV ↕PD
R12	R12 ↕PV ↕PD ↕PE
R13	R13 ↕PV ↕PS
R14	R14 ↕PV ↕PS ↕PE
R15	R15 ↕PV ↕PS ↕PD
R16	R16 ↕PV ↕PS ↕PD ↕PE

⚠ Caution when ordering manifold

The asterisk denotes the symbol for assembly.
Prefix it to the ejector part numbers to be mounted. When it is not added, the manifold base and ejector are shipped separately.

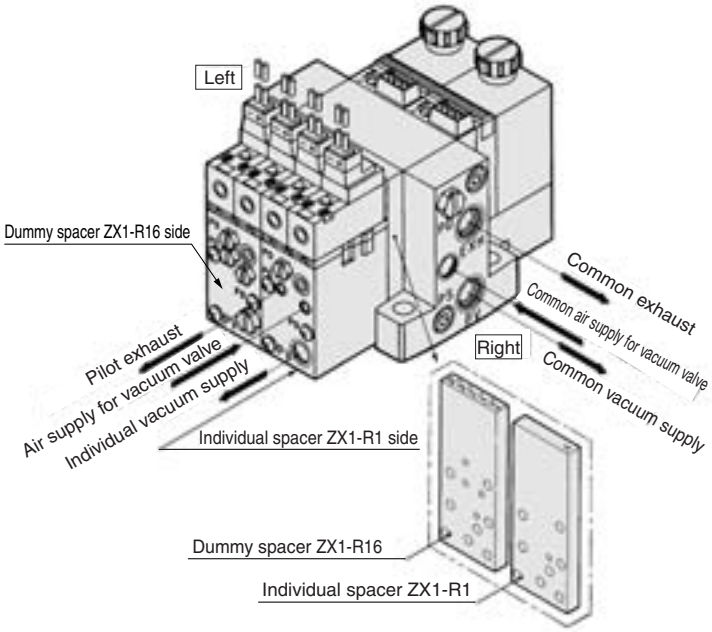
Manifold/System Circuit Example

When not using individual spacer

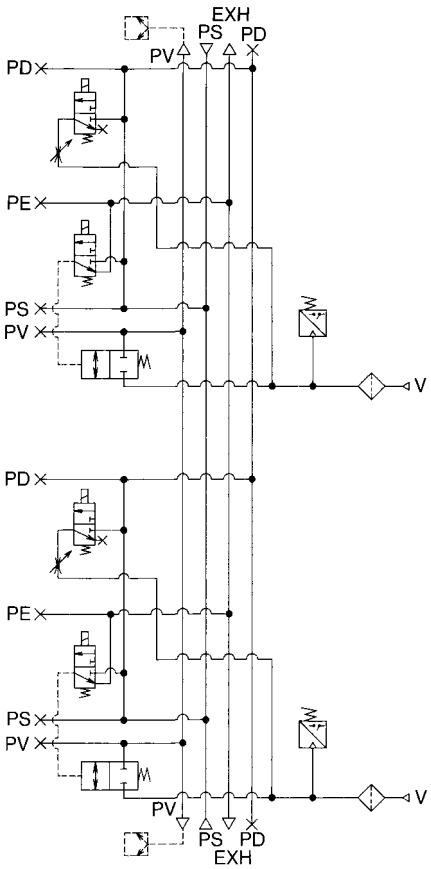


PV: Vacuum pressure SUP port
PS: Pilot pressure SUP port
PD: Release pressure SUP port
PE: Pilot pressure EXH port
EXH: Common EXH port

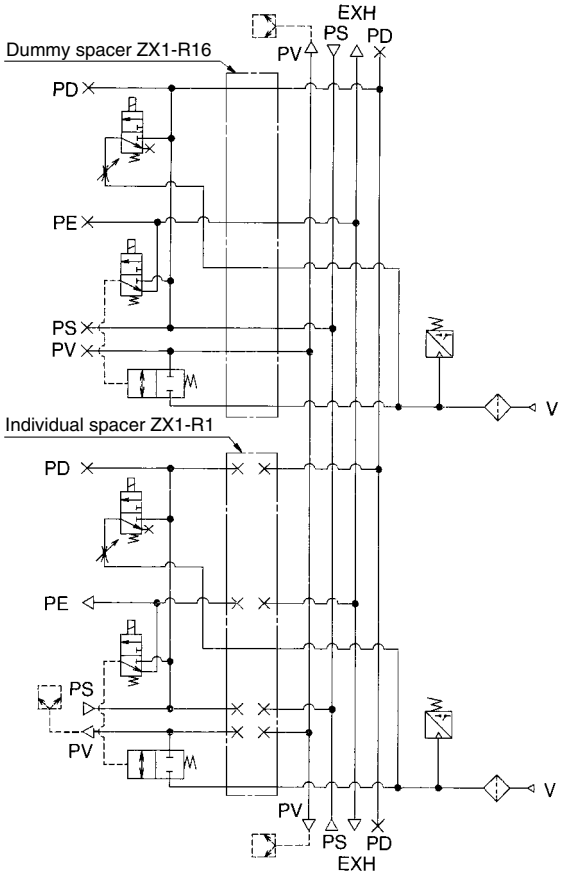
When using individual spacer (When using ZX1-R1)



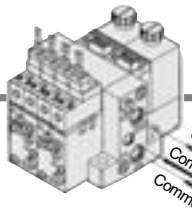
<System circuit example>



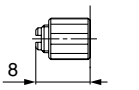
<System circuit example>

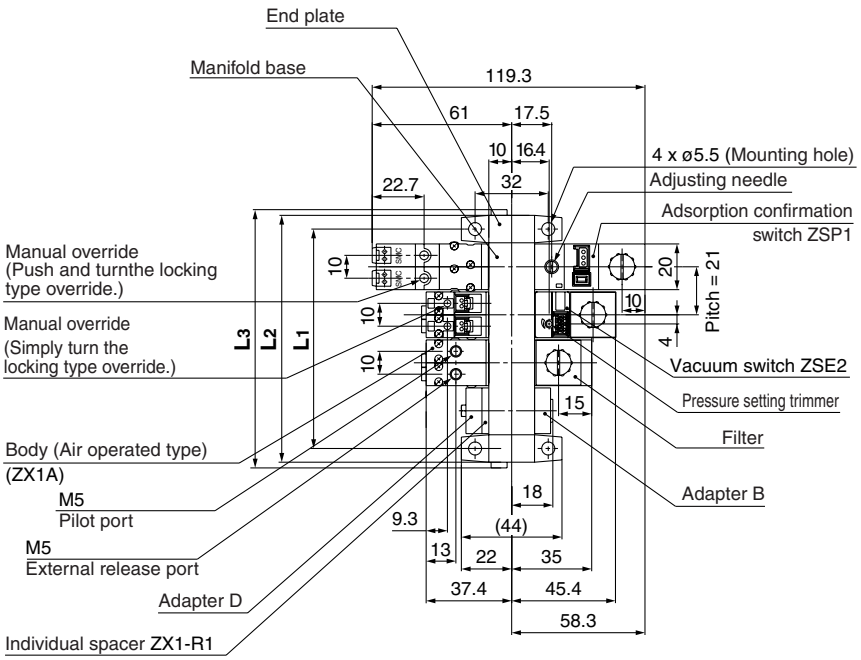


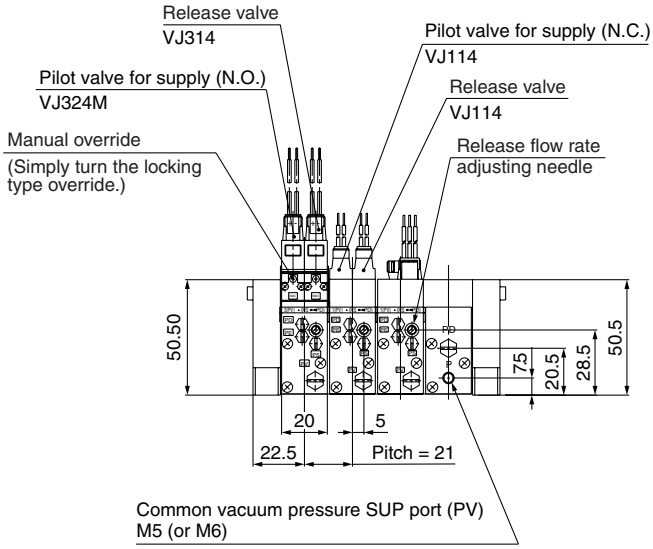
Vacuum Pump System Manifold

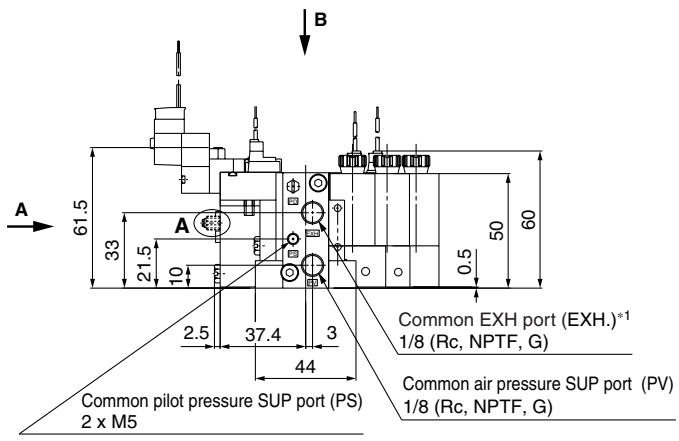


A: Release flow rate adjusting needle with lock nut









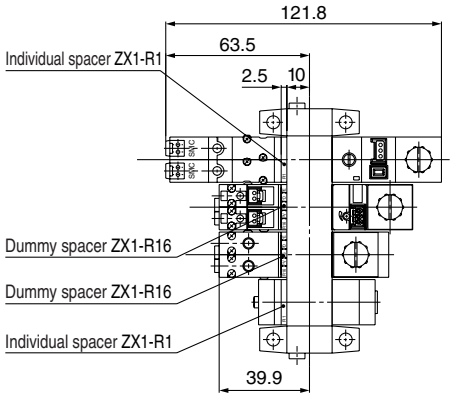
*1 The common exhaust port (EXH.) is also used as the pilot pressure exhaust (PE) port of pilot valve. Use while the port is open to the atmosphere.

(mm)

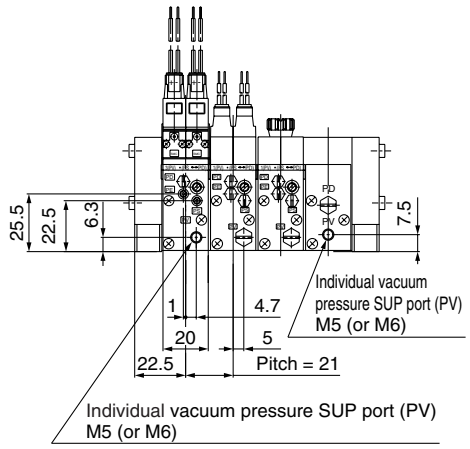
Symbol \ Stations	1	2	3	4	5	6	7	8
L1	33	54	75	96	117	138	159	180
L2	45	66	87	108	129	150	171	192
L3	50	71	92	113	134	155	176	197

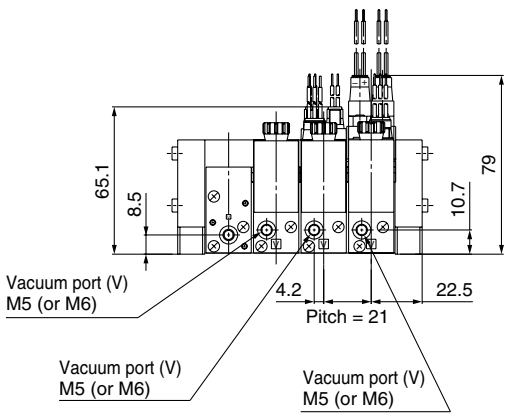
(In the case of individual spacer)

B cross section



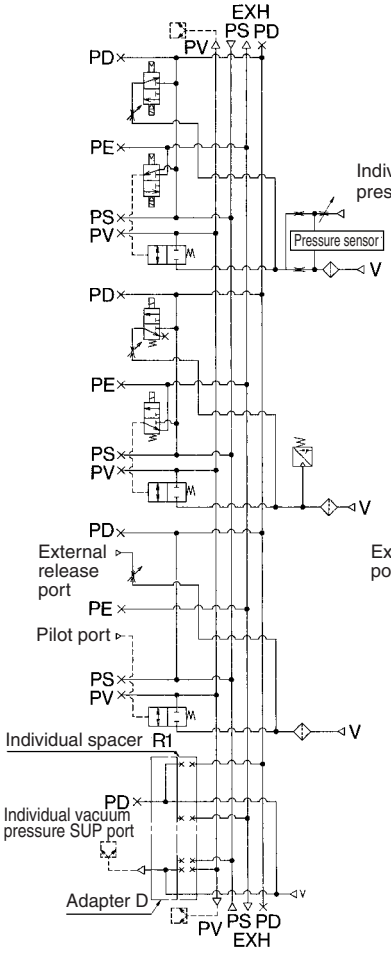
A cross section



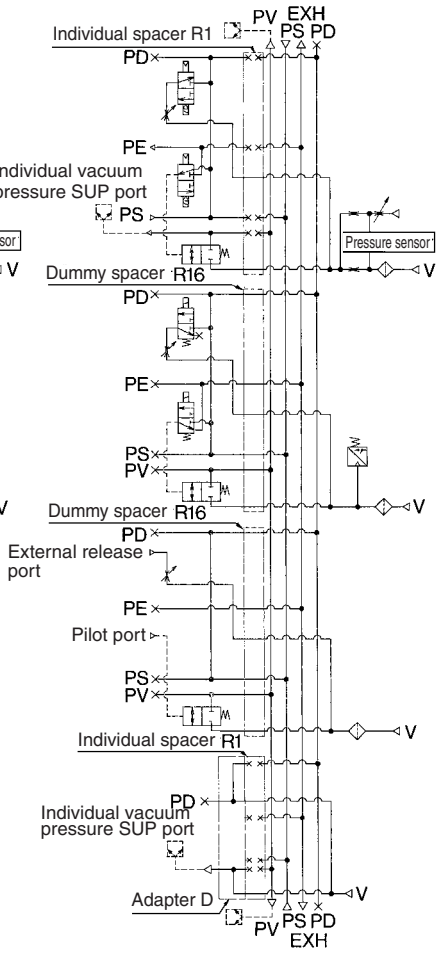


System circuit example

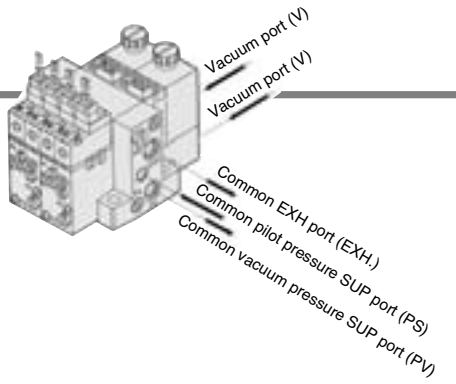
(Standard)



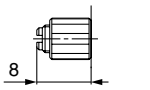
(Option)
(In the case of individual spacer)

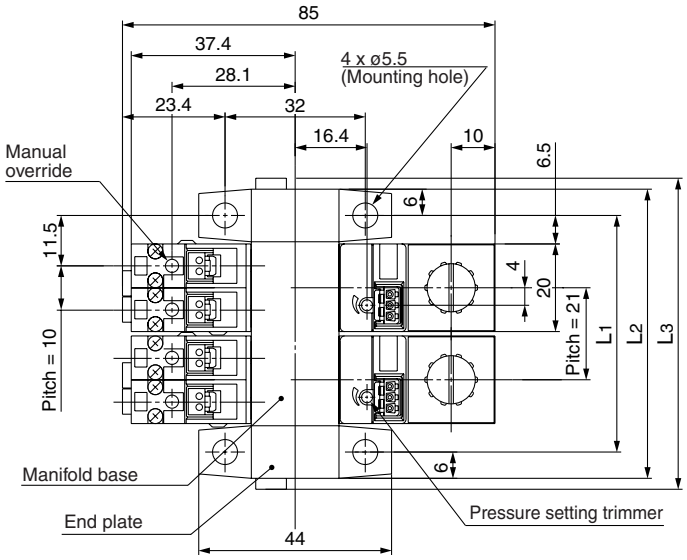


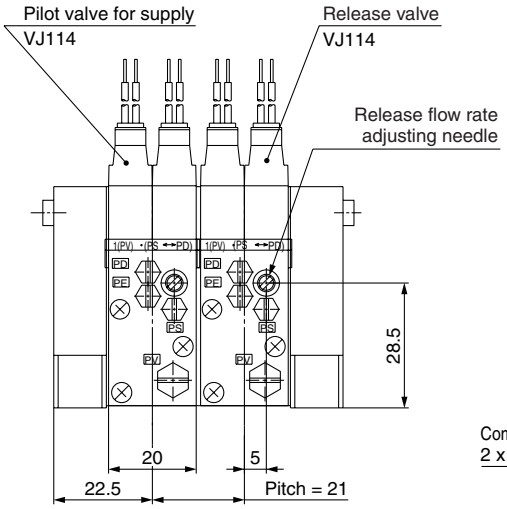
Vacuum Pump System Manifold: Type K1

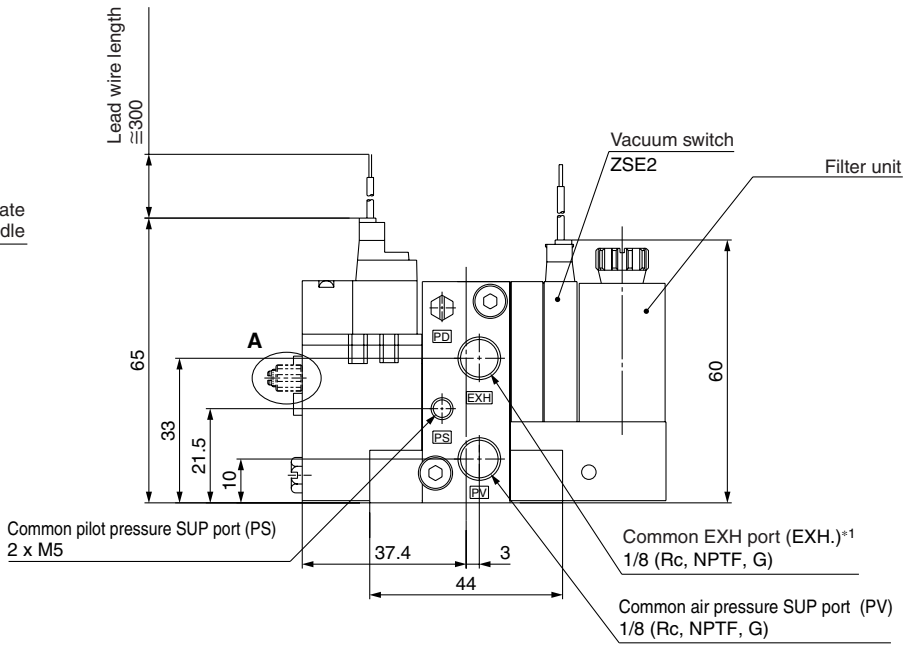


A: Release flow rate adjusting needle with lock nut







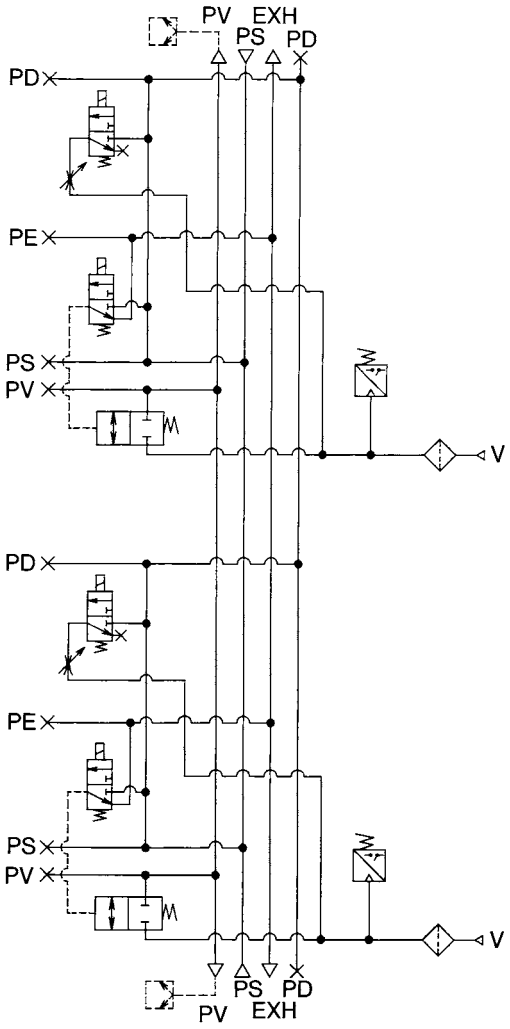


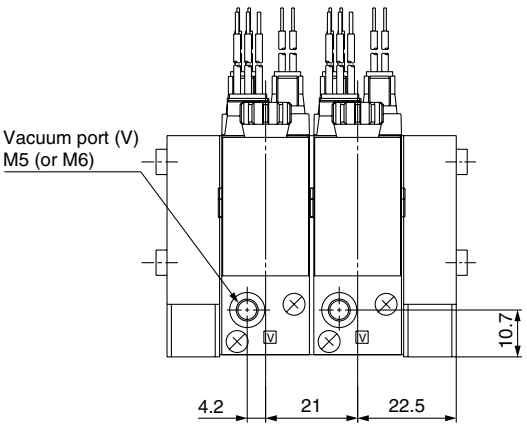
(mm)

Symbol \ Stations	1	2	3	4	5	6	7	8
L1	33	54	75	96	117	138	159	180
L2	45	66	87	108	129	150	171	192
L3	50	71	92	113	134	155	176	197

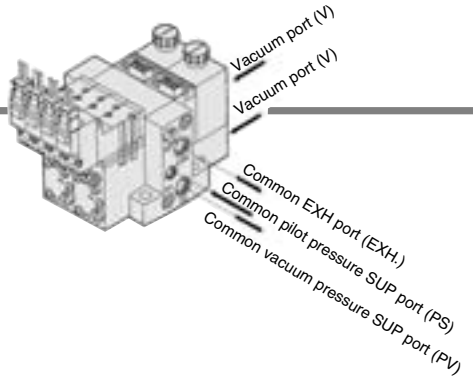
*1 The common exhaust port (EXH.) is also used as the pilot pressure exhaust (PE) port of pilot valve. Use while the port is open to the atmosphere.

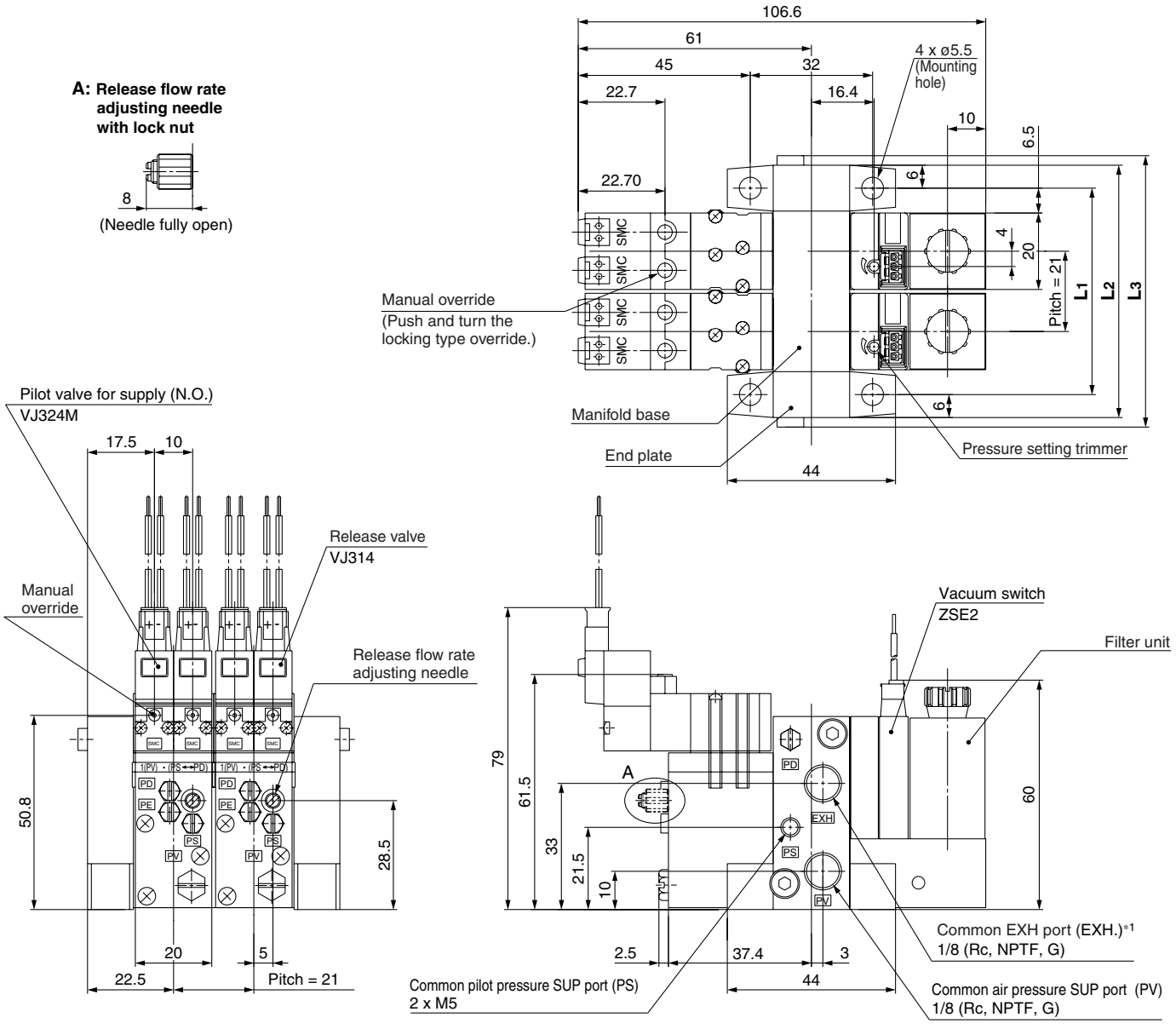
Circuit diagram





Vacuum Pump System Manifold: Type K3

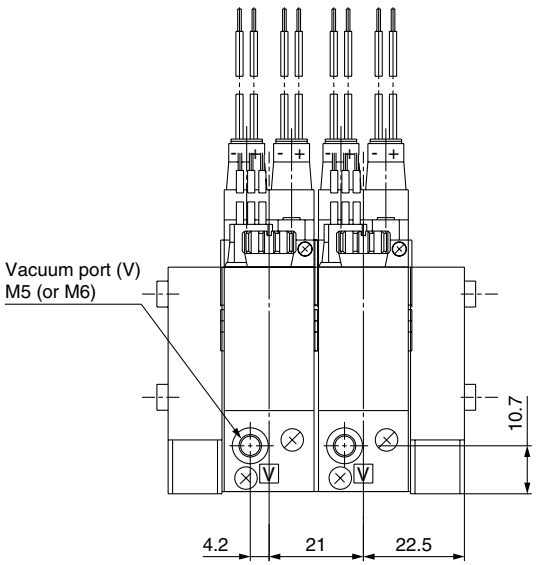




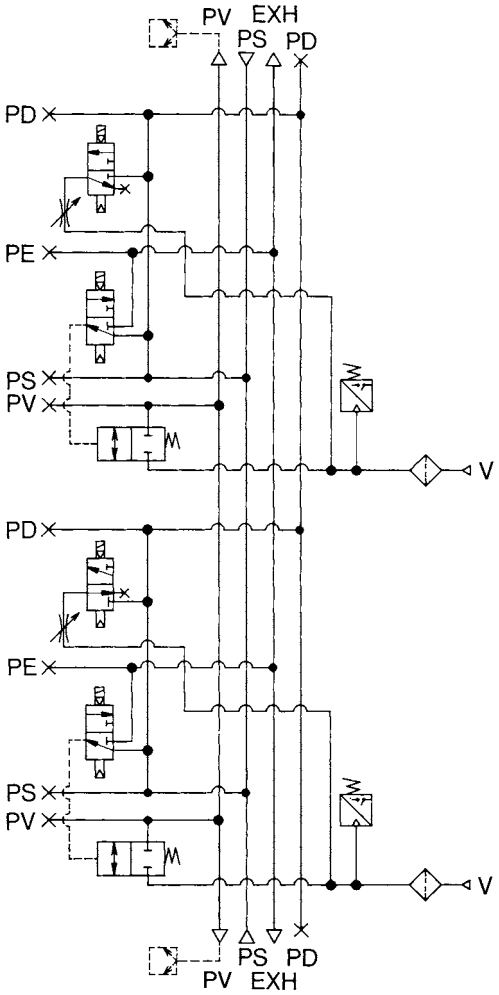
*1 The common exhaust port (EXH.) is also used as the pilot pressure exhaust (PE) port of pilot valve. Use while the port is open to the atmosphere.

(mm)

Symbol \ Stations	1	2	3	4	5	6	7	8
L1	33	54	75	96	117	138	159	180
L2	45	66	87	108	129	150	171	192
L3	50	71	92	113	134	155	176	197

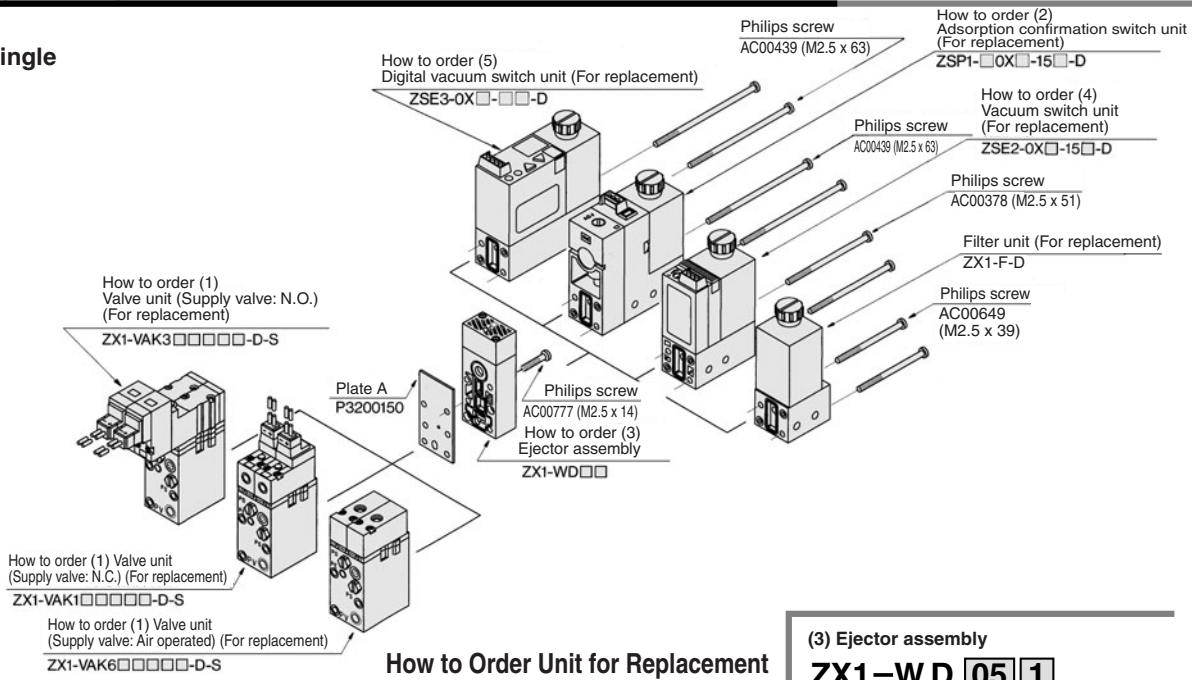


Circuit diagram



Ejector System/Unit Construction (Refer to below for unit replacement.)

Single



How to Order Unit for Replacement

(1) Valve unit

ZX1 – V A K1 □ 5 L Z B □ – L – D – S – □

For ejector system

Combination of supply valve and release valve
(Refer to page 867 for details.)

Pilot valve

Nil	DC: 1 W (With indicator light: 1.05 W)
	AC
Y *	DC: 0.45 W (With indicator light: 0.5 W)

* Only 24 VDC and 12 VDC are applicable to 0.45 W.

Solenoid valve rated voltage

		CE compliant
1 *	100 VAC 50/60 Hz	—
3 *	110 VAC 50/60 Hz	—
5	24 VDC	●
6	12 VDC	●
V	6 VDC	●
S	5 VDC	●
R	3 VDC	●

* Applicable to plug connector only. (Connector assembly with rectifier is attached.)

Electrical entry

L	L plug connector

Light/Surge voltage suppressor

Nil	None
Z	With light/surge voltage suppressor

Manual operation

Nil	Non-locking push type
B	Locking slotted type

PV port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Release flow rate adjusting needle

Nil	Without lock nut
L	With lock nut

Unit for replacement

Single
(PD and PS ports are equipped with plugs.)

CE compliant

Nil	—
Q	CE compliant

(2) Adsorption confirmation switch unit

ZSP1 – B 0X □ – 15 C – D

Applicable nozzle diameter

S	0.3 to 0.7mm
B	0.5 to 1.2mm

Piping specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

Unit for replacement

(3) Ejector assembly

ZX1 – W D 05 1

Unit for replacement

Nozzle diameter

05	0.5 mm
07	0.7 mm
10	1.0 mm

Ejector exhaust

1	Built-in silencer
2	Port exhaust Rc 1/8

(4) Vacuum switch unit

ZSE2 – 0X □ – 15 C – D

Output specifications

15	NPN open collector
55	PNP open collector

Piping specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

Unit for replacement

(5) Digital vacuum switch unit

ZSE3 – 0X □ – 21 C – D

Output specifications

21	2 outputs/without analog output
22	2 outputs/with analog output
23	1 output (with trouble detection)/without analog output
24	1 output (with trouble detection)/with analog output

Note) Analog output is available only on grommet type.

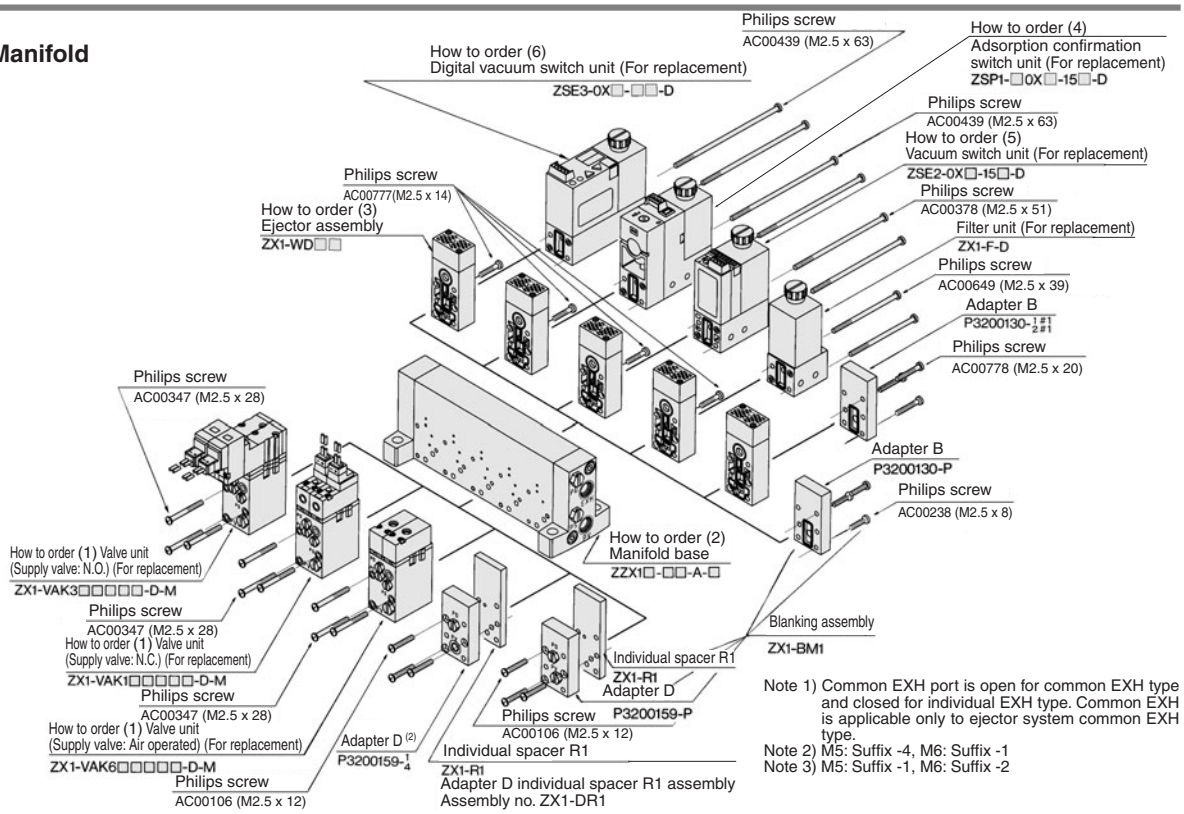
Piping specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

Unit for replacement

D: Unit for replacement.
Ex.) If an adsorption confirmation switch is replaced for a vacuum switch on ZX1071-K15LZ-PBC, indicate as ZSE2-0X-15C-D. In this case, mounting screws AC00378 (M2.5 x 51) (2 pcs.) are required.
If the unit is used on its own, not combined with others, "D" is not required. (Valve unit, ejector assembly and switch unit)
Ex.) ZSE2-0X-15C, ZX1-VAK15LZ, ZX1-W051

Manifold



Note 1) Common EXH port is open for common EXH type and closed for individual EXH type. Common EXH is applicable only to ejector system common EXH type.
Note 2) M5: Suffix -4, M6: Suffix -1
Note 3) M5: Suffix -1, M6: Suffix -2

How to Order Unit for Replacement

(1) Valve unit ∗ Refer to page 872 for details.

ZX1 – V A K1 □ 5 L Z B – L – D – M – □

- **For ejector system**
- **Combination of supply valve and release valve**
- **Pilot valve**
- **Solenoid valve rated voltage**
- **Electrical entry**
- **Light/Surge voltage suppressor**
- **Manual operation**
- **Release flow rate adjusting needle**

Nil	Without lock nut
L	With lock nut

- **Manifold** (All ports are equipped with plugs.)
- **CE compliant**
- **Unit for replacement**

(2) Manifold base

ZZX1 05 – □ R – A – C

- **Stations**

01	1
⋮	⋮
08	8

- **Thread type**

Nil	Rc 1/8
F	G
T	NPTF

- **Supply port location**

R	Right side
L	Left side
B	Both sides

- **For ejector system** (PD and PS ports are equipped with plugs.)
- **Exhaust**

Nil	Individual exhaust
C	Common exhaust

(3) Ejector assembly

ZX1 – W D 05 1

- **Unit for replacement**
- **Nozzle diameter**

05	0.5 mm
07	0.7 mm
10	1.0 mm

- **Ejector exhaust**

1	Built-in silencer
2	Port exhaust Rc 1/8
3	Manifold common exhaust

(4) Adsorption confirmation switch unit

ZSP1 – B 0X □ – 15 C – D

- **Applicable nozzle diameter**

S	0.3 to 0.7 mm
B	0.5 to 1.2 mm

- **Piping specifications**

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

- **Unit for replacement**

(5) Vacuum switch unit

ZSE2 – 0X □ – 15 C – D

- **Output specifications**

15	NPN open collector
55	PNP open collector

- **Piping specifications**

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

- **Unit for replacement**

(6) Digital vacuum switch unit

ZSE3 – 0X □ – 21 C – D

- **Output specifications**

21	2 outputs/without analog output
22	2 outputs/with analog output
23	1 output (with trouble detection)/without analog output
24	1 output (with trouble detection)/with analog output

- **Piping specifications**

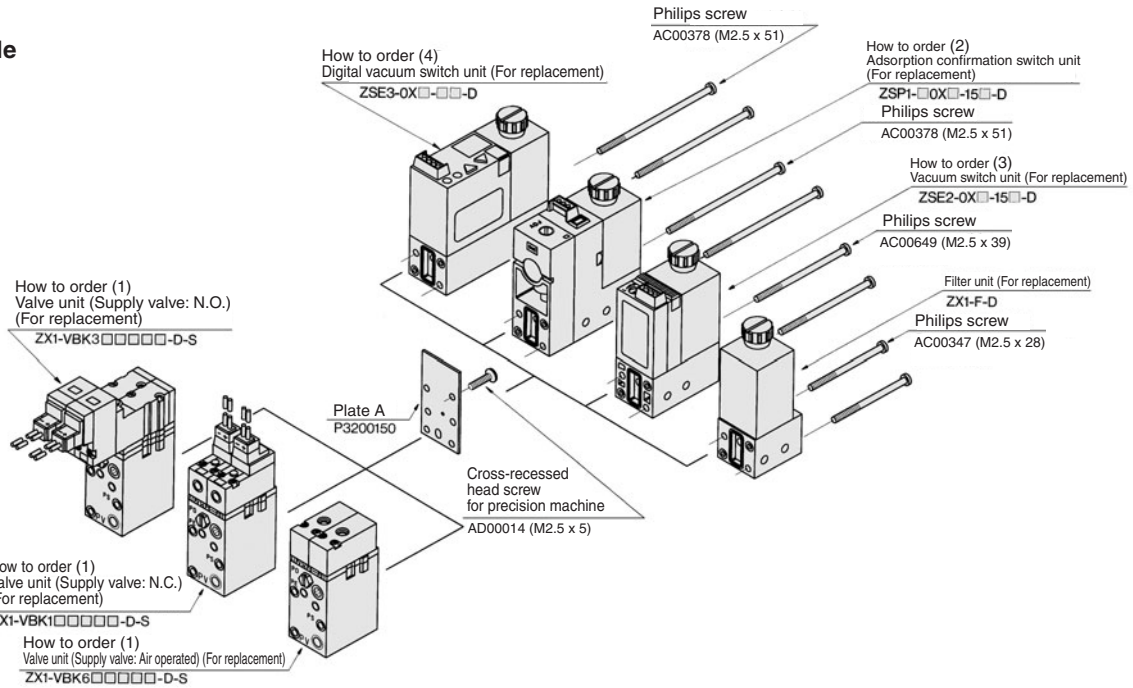
Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

- **Unit for replacement**

Note) Analog output is available only on grommet type.

Vacuum Pump System/Unit Construction (Refer to below for unit replacement.)

Single



How to Order Unit for Replacement

(1) Valve unit

ZX1−V B K1 □ 5 L Z B □ − L − D − S − □

Vacuum pump for system

Combination of supply valve and release valve
(Refer to page 903 for details.)

Pilot valve

Nil	DC: 1 W (With indicator light: 1.05 W)
	AC
Y *	DC: 0.45 W (With indicator light: 0.5 W)

* Only 24 VDC and 12 VDC are applicable to 0.45 W.

Solenoid valve rated voltage

		CE compliant
1 *	100 VAC 50/60 Hz	—
3 *	110 VAC 50/60 Hz	—
5	24 VDC	●
6	12 VDC	●
V	6 VDC	●
S	5 VDC	●
R	3 VDC	●

* Applicable to plug connector only.
(Connector assembly with rectifier is attached.)

Electrical entry

L	L plug connector

Light/Surge voltage suppressor

Nil	None
Z	With light/surge voltage suppressor

Manual operation

Nil	Non-locking push type
B	Locking slotted type

PV port size

Nil	M5 x 0.8
Y	M6 x 1 (Option)

Release flow rate adjusting needle

Nil	Without lock nut
L	With lock nut

Unit for replacement

Single
(PD port is equipped with plug.)

CE compliant

Nil	—
Q	CE compliant

D: Unit for replacement
Ex.) If an adsorption confirmation switch is replaced for a vacuum switch on ZX100-K15LZ-PBC, indicate as ZSE2-0X-15C-D. In this case, mounting screws AC00649 (M2.5 x 39) are required.
If the unit is used on its own, not combined with others, "D" is not required.
Ex.) ZSE2-0X-15C, ZX1-VBK15LZ

(2) Adsorption confirmation switch unit

ZSP1−B0X □ −15 C −D

Applicable nozzle diameter

S	0.3 to 0.7 mm
B	0.5 to 1.2 mm

Piping specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

Unit for replacement

(3) Vacuum switch unit

ZSE2−0X □ − 15 C −D

Output specifications

15	NPN open collector
55	PNP open collector

Piping specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

Unit for replacement

(4) Digital vacuum switch unit

ZSE3−0X □ − 21 C −D

Piping specifications

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

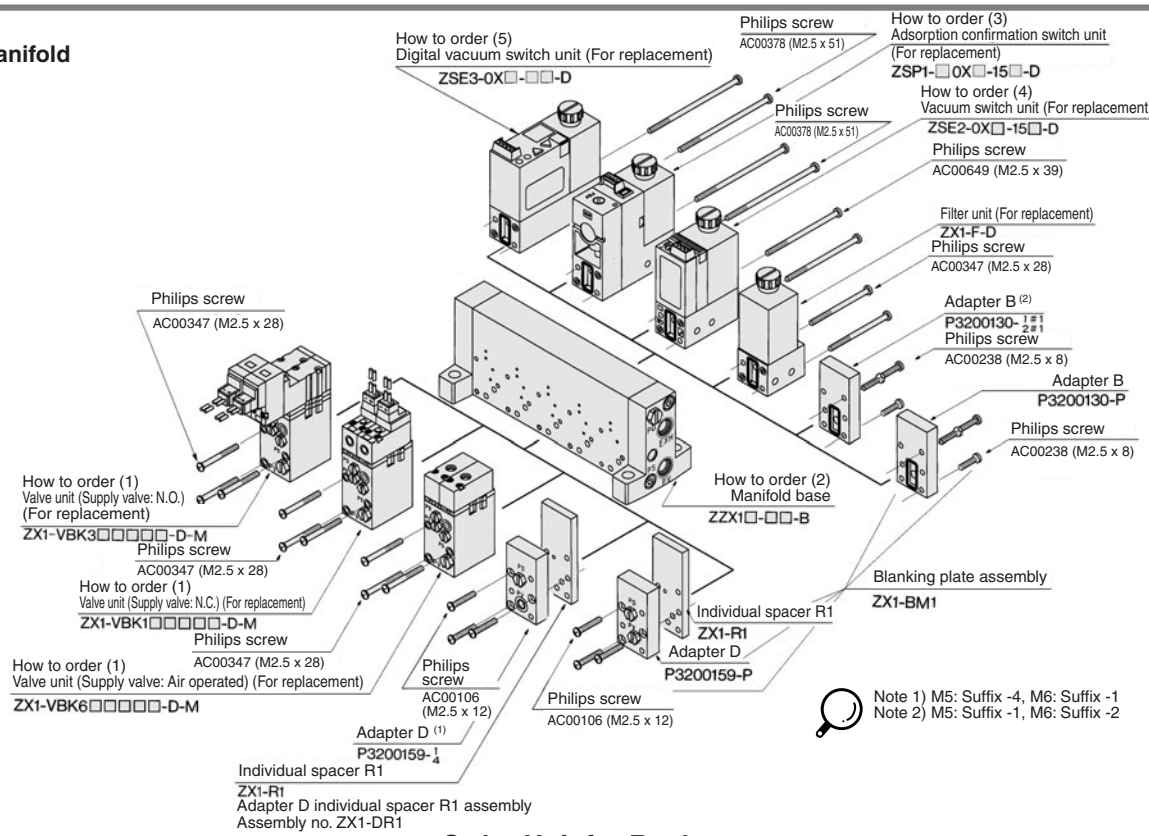
Unit for replacement

Output specifications

21	2 outputs/without analog output
22	2 outputs/with analog output
23	1 output (with trouble detection)/without analog output
24	1 output (with trouble detection)/with analog output

Note) Analog output is available only on grommet type.

Manifold



How to Order Unit for Replacement

(1) Valve unit ∗ Refer to page 906 for details.

ZX1 – V B K1 □ 5 L Z B – L – D – M – □

- **Vacuum pump for system**
- **Combination of supply valve and release valve**
- **Pilot valve**
- **Solenoid valve rated voltage**
- **Light/Surge voltage suppressor**
- **Electrical entry**
- **Manual operation**
- **Unit for replacement**
- **Release flow rate adjusting needle**

Nil	Without lock nut
L	With lock nut

- **Manifold** (All ports are equipped with plugs.)
- **CE compliant**

(2) Manifold base ∗ Refer to page 916 for details.

ZZX1 06 – □ R – B

- **Stations**

01	1
⋮	⋮
08	8

- **Thread type**

Nil	Rc 1/8
F	G
T	NPTF

- **Supply port location**

R	Right side
L	Left side
B	Both sides

- **System for external vacuum** (PD port is equipped with plug.)

(3) Adsorption confirmation switch unit

ZSP1 – B0X □ – 15 C – D

- **Applicable nozzle diameter**

S	0.3 to 0.7 mm
B	0.5 to 1.2 mm

- **Piping specifications**

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

- **Unit for replacement**

(4) Vacuum switch unit

ZSE2 – 0X □ – 15 C – D

- **Output specifications**

15	NPN open collector
55	PNP open collector

- **Piping specifications**

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

- **Unit for replacement**

(5) Digital vacuum switch unit

ZSE3 – 0X □ – 21 C – D

- **Unit for replacement**
- **Piping specifications**

Nil	Grommet (0.6 m)
L	Grommet (3 m)
C	Connector (0.6 m)
CL	Connector (3 m)
CN	Without connector

- **Output specifications**

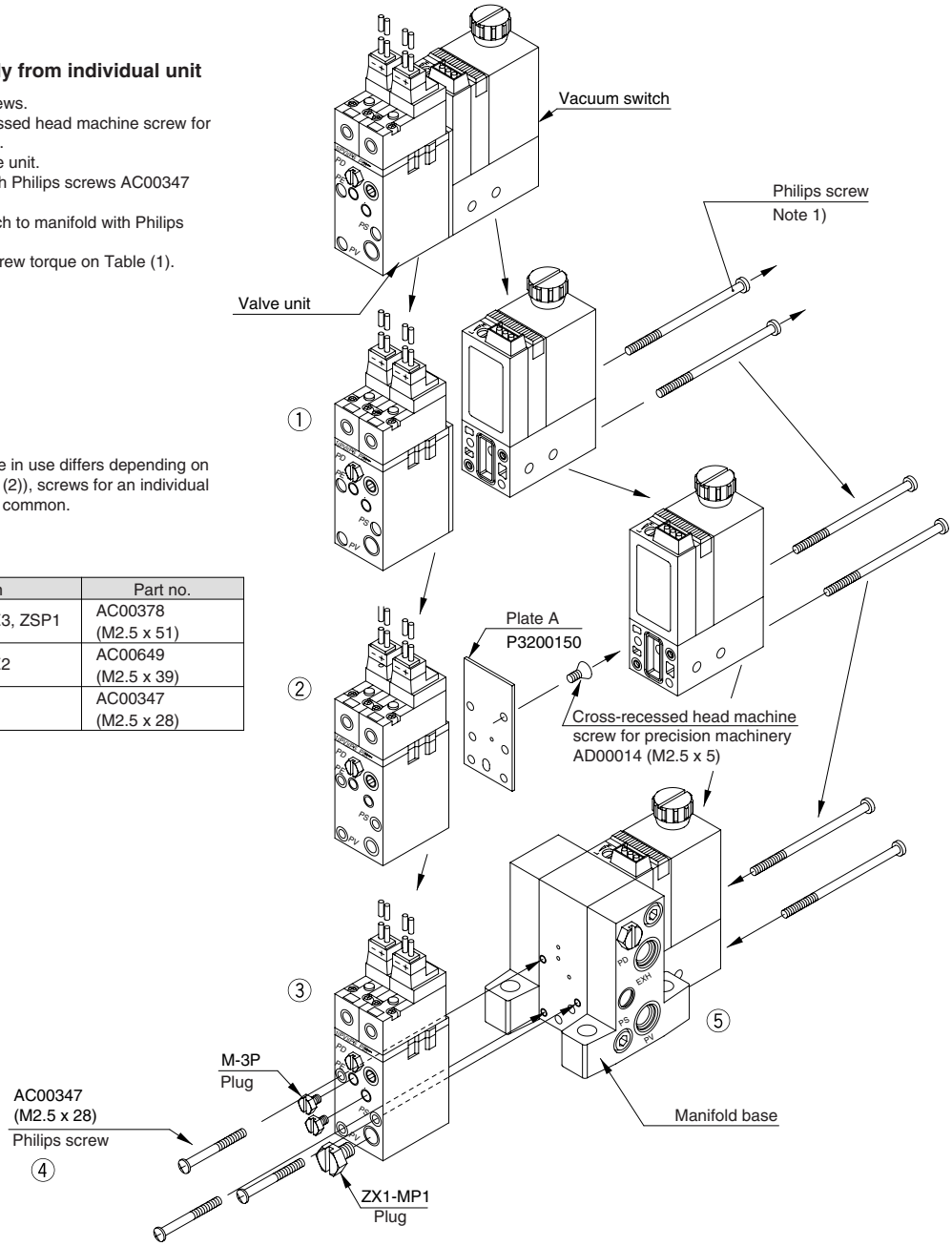
21	2 outputs/without analog output
22	2 outputs/with analog output
23	1 output (with trouble detection)/without analog output
24	1 output (with trouble detection)/with analog output

Note) Analog output is available only on grommet type.

Vacuum Pump System/Manifold Assembly from Individual Unit

Manifold Assembly from individual unit

1. Remove Philips screws.
2. Remove cross-recessed head machine screw for precision machinery.
3. Mount plugs to valve unit.
4. Mount valve unit with Philips screws AC00347 (M2.5 x 28) 3 pcs.
5. Mount vacuum switch to manifold with Philips screws 2 pcs.
   Follow tightening screw torque on Table (1).



Note 1)
Even though screw type in use differs depending on the combination (Table (2)), screws for an individual unit and a manifold are common.

Table (2)

Combination	Part no.
Vacuum switch ZSE3, ZSP1	AC00378 (M2.5 x 51)
Vacuum switch ZSE2	AC00649 (M2.5 x 39)
Filter unit ZX1-F	AC00347 (M2.5 x 28)

Table (1)

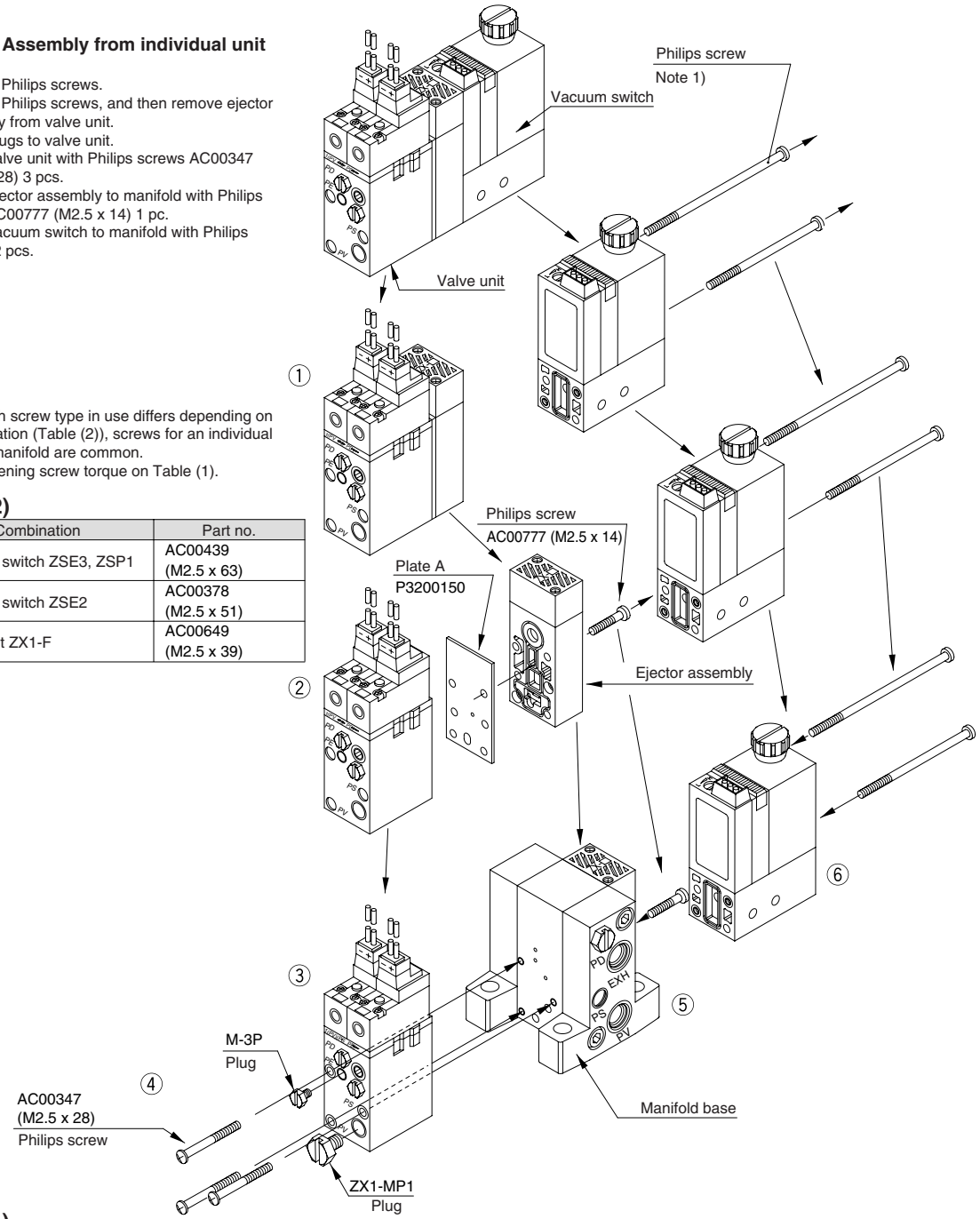
Part no.	Description	Quantity	Recommended tightening screw torque	In the case of manifold	Single unit
Note 1)	Philips screw	2	0.28 ± 0.1 (N·m)	Necessary	Necessary
P3200150	Plate A	1		Not necessary	Necessary
AD00014 (M2.5 x 5)	Cross-recessed head machine screw for precision machinery	1	0.28 ± 0.1 (N·m)	Not necessary	Necessary
M-3P	Plug	2	0.46 ± 0.05 (N·m)	Necessary	Not necessary
ZX1-MP1	Plug	1	1.6 ± 0.15 (N·m)	Necessary	Not necessary
AC00347 * (M2.5 x 28)	Philips screw	3	0.28 ± 0.1 (N·m)	Necessary	Not necessary

* Use AC00018 (M2.5 x 32) when individual spacers are used.

Ejector System/Manifold Assembly from Individual Unit

Manifold Assembly from individual unit

1. Remove Philips screws.
2. Remove Philips screws, and then remove ejector assembly from valve unit.
3. Mount plugs to valve unit.
4. Mount valve unit with Philips screws AC00347 (M2.5 x 28) 3 pcs.
5. Mount ejector assembly to manifold with Philips screw AC00777 (M2.5 x 14) 1 pc.
6. Mount vacuum switch to manifold with Philips screws 2 pcs.



Note 1)
Even though screw type in use differs depending on the combination (Table (2)), screws for an individual unit and a manifold are common.
Follow tightening screw torque on Table (1).

Table (2)

Combination	Part no.
Vacuum switch ZSE3, ZSP1	AC00439 (M2.5 x 63)
Vacuum switch ZSE2	AC00378 (M2.5 x 51)
Filter unit ZX1-F	AC00649 (M2.5 x 39)

Table (1)

Part no.	Description	Quantity	Recommended tightening screw torque	In the case of manifold	Single unit
Note 1)	Philips screw	2	0.28 ± 0.1 (N·m)	Necessary	Necessary
P3200150	Plate A	1		Not necessary	Necessary
AC00777 (M2.5 x 14)	Philips screw	1	0.28 ± 0.1 (N·m)	Necessary	Necessary
M-3P	Plug	1	0.46 ± 0.05 (N·m)	Necessary	Not necessary
ZX1-MP1	Plug	1	1.6 ± 0.15 (N·m)	Necessary	Not necessary
AC00347 * (M2.5 x 28)	Philips screw	3	0.28 ± 0.1 (N·m)	Necessary	Not necessary

* Use AC00018 (M2.5 x 32) when individual spacers are used.

Made to Order Specifications:

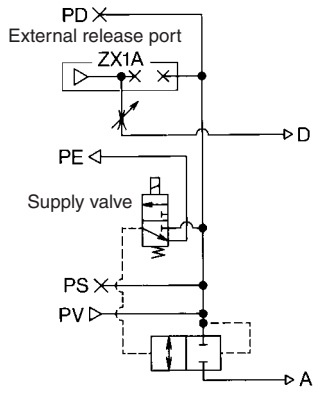
Please consult with SMC for detailed size, specifications and delivery.

1 Valve Unit/Other Combinations of Supply Valve and Release Valve (Ejector unit)

Ejector Unit

If those other than the standard combination of supply valves and release valves (Refer to page 867.) are required, select from the following combinations. (Refer to page 866 for "How to Order".)

Combination Symbol: K2

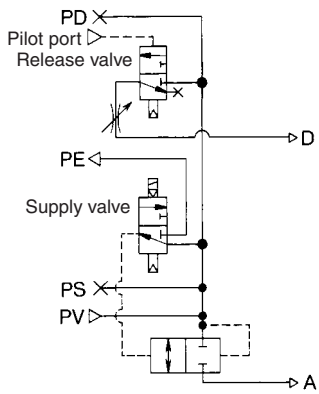


Application: The supply pressure is controlled by electric signals and a vacuum release is effected by external air.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	External 2 port valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K4

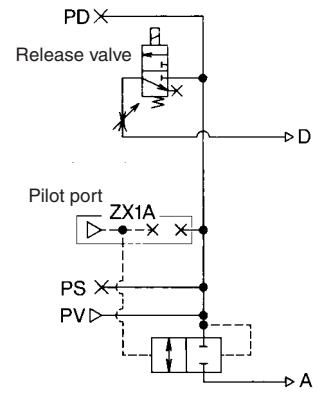


Application: The supply pressure is restricted by electric signals and a vacuum release is effected by air signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	Air operated valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: K5

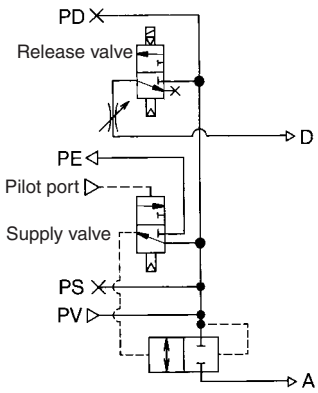


Application: The supply pressure is controlled by external air signals and a vacuum release is effected by the solenoid valve.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 3 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K7

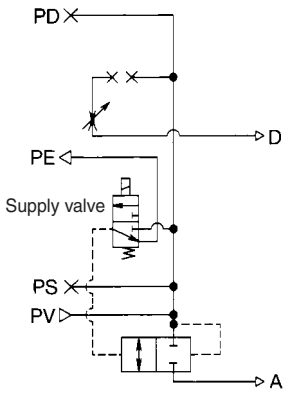


Application: The supply pressure is controlled by external air signals and a vacuum release is effected by the solenoid valve. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve	Release valve
	Air operated valve	Solenoid valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: J1

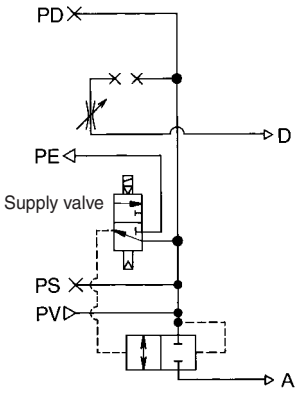


Application: This combination is used for effecting control in accordance with electric signals. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This combination is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	———
1. Work adsorption	ON	———
2. Vacuum release	OFF	———
3. Operation stop	OFF	———

Combination Symbol: J2

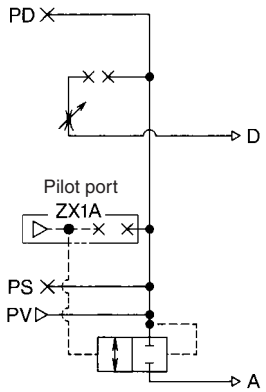


Application: It is used for controlling the supply pressure through electric signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This is used for preventing the workpieces from dropping during power outages. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This combination is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	———
1. Work adsorption	OFF	———
2. Vacuum release	ON	———
3. Operation stop	ON	———

Combination Symbol: J3

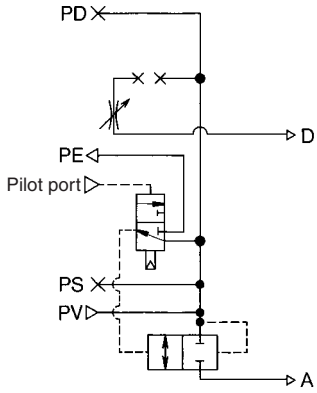


Application: The supply pressure is controlled by external air signals. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 3 port valve	———
1. Work adsorption	ON	———
2. Vacuum release	OFF	———
3. Operation stop	OFF	———

Combination Symbol: J4

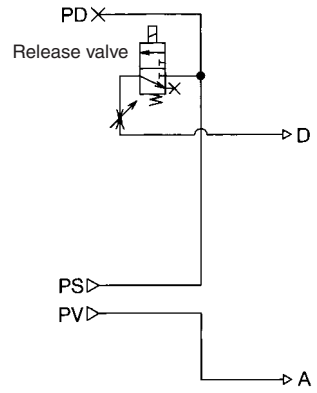


Application: The supply pressure is controlled by external air signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This is used for preventing the workpieces from dropping during power outages. A vacuum release is effected by the intrusion of air between the silencer, pad, and the workpiece. This type is used when there is no need to accelerate the vacuum release speed.

How to Operate

Valve / Condition	Supply valve	Release valve
	Air operated valve	———
1. Work adsorption	OFF	———
2. Vacuum release	ON	———
3. Operation stop	OFF	———

Combination Symbol: D1

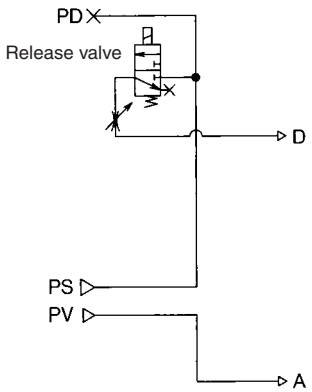


Application: The supply pressure is controlled by the external valve and a vacuum release is effected by the solenoid valve.

How to Operate

Valve / Condition	Supply valve	Release valve
	External valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D2

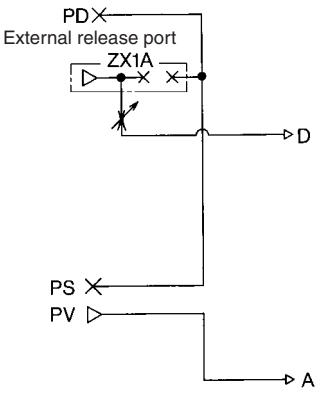


Application: The supply pressure is controlled by the external valve and a vacuum release is effected by the solenoid valve.

How to Operate

Valve / Condition	Supply valve	Release valve
	External valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D3

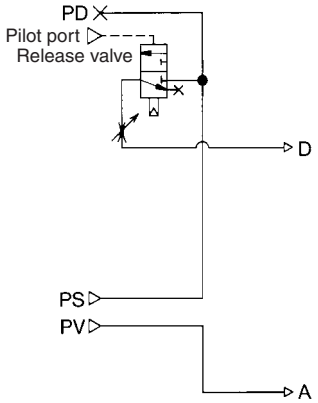


Application: The supply pressure is controlled by the external valve and a vacuum release is effected by the external 2 port valve (vacuum valve).

How to Operate

Valve / Condition	Supply valve	Release valve
	External valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D4



Application: The supply pressure is controlled by the external valve and a vacuum release is effected by external air signals.

How to Operate

Valve / Condition	Supply valve	Release valve
	External valve	Air operated valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Made to Order Specifications:

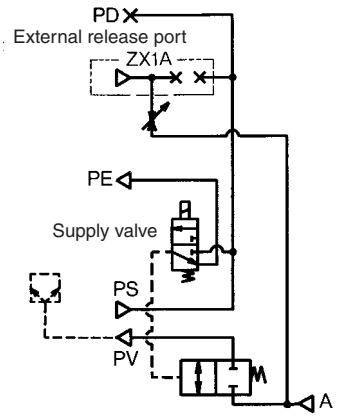
Please consult with SMC for detailed size, specifications and delivery.

2 Valve Unit/Other Combinations of Supply Valve and Release Valve (Vacuum pump system)

Vacuum Pump System

If those other than the standard combination of supply valves (Refer to page 903.) and release valves are required, select from the following combinations. (Refer to page 902 for "How to Order".)

Combination Symbol: K2

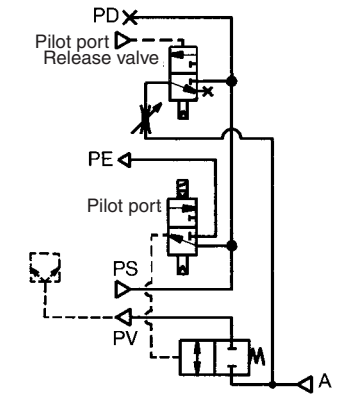


Application: The supply pressure is controlled by electric signals and a vacuum release is effected by external air.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	External 2 port valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K4

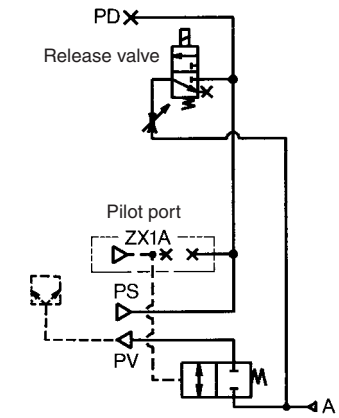


Application: The supply pressure is controlled by electric signals and a vacuum release is effected by air signals. Because the supply valve is N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	Solenoid valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	ON

Combination Symbol: K5

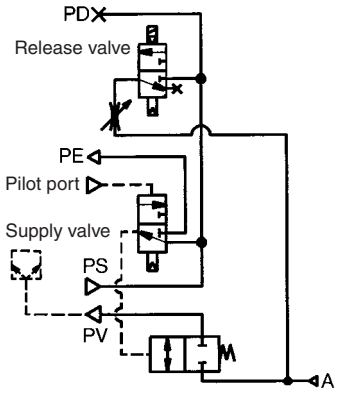


Application: The supply pressure is controlled by external air signals and a vacuum release is effected by the solenoid valve.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 3 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: K7

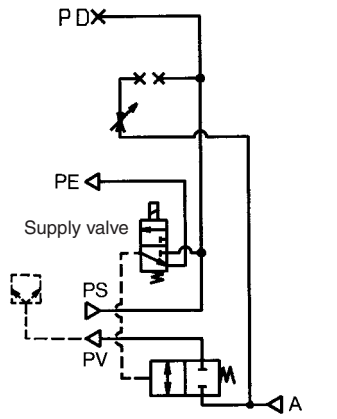


Application: The supply pressure is controlled by external air signals and a vacuum release is effected by the solenoid valve. Because the supply valve is the N.O., the pressure that is supplied to the ejector is not interrupted during a power outage; as a result, the state of suction can be maintained. This combination is used for preventing the workpieces from dropping during power outages.

How to Operate

Valve / Condition	Supply valve	Release valve
	Air operated valve	Solenoid valve
1. Work adsorption	OFF	OFF
2. Vacuum release	ON	ON
3. Operation stop	ON	OFF

Combination Symbol: J1

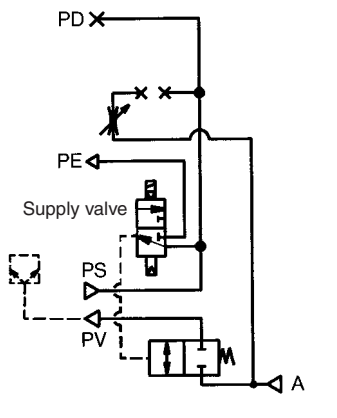


Application: This combination is used for controlling the pressure by electric signals. Normally, the workpiece is released due to the air leakage that occurs between the pad and the workpiece. However, if there is no air leakage, the workpiece will not become detached because the vacuum state is maintained even when the supply valve is turned OFF. To effect releasing, an external 2 port valve (vacuum valve) must be provided.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	———
1. Work adsorption	ON	———
2. Vacuum release	OFF	———
3. Operation stop	OFF	———

Combination Symbol: J2

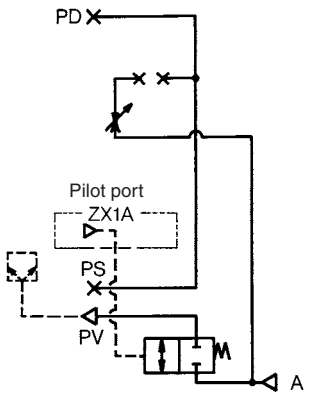


Application: Used for controlling with electric signals. Because the supply N.O., the pressure is not interrupted during a power outage. This prevents the workpieces from dropping. Normally, the workpiece is released due to leakage. However, if no air leakage, the workpiece will not detach because the vacuum state is maintained even when the supply valve is turned ON. To release, an external 2 port valve (vacuum valve) must be used.

How to Operate

Valve / Condition	Supply valve	Release valve
	Solenoid valve	———
1. Work adsorption	OFF	———
2. Vacuum release	ON	———
3. Operation stop	ON	———

Combination Symbol: J3

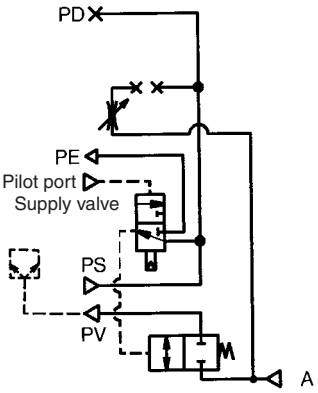


Application: The supply pressure is controlled by external air signals. Normally, the workpiece is released due to the air leakage that occurs between the pad and the workpiece. However, if there is no air leakage, the workpiece will not become detached because the vacuum state is maintained even when the supply valve is turned OFF. To effect releasing, an external 2 port valve (vacuum valve) must be provided.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 3 port valve	———
1. Work adsorption	ON	———
2. Vacuum release	OFF	———
3. Operation stop	OFF	———

Combination Symbol: J4

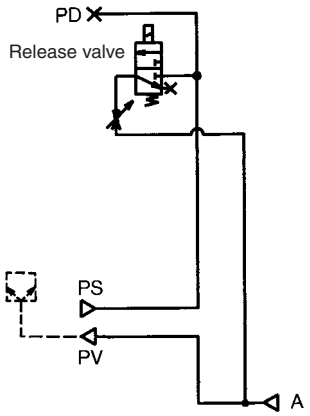


Application: Supply is controlled by external air signals. Because the valve is N.O., the pressure is not interrupted during a power outage. This prevents the workpieces from dropping. Normally, the workpiece is released due to leakage. However, if no leakage, the workpiece will not detach because the vacuum state is maintained even when the valve is turned ON. To release, an external 2 port valve (vacuum valve) must be provided.

How to Operate

Valve / Condition	Supply valve	Release valve
	Air operated valve	———
1. Work adsorption	OFF	———
2. Vacuum release	ON	———
3. Operation stop	ON	———

Combination Symbol: D1

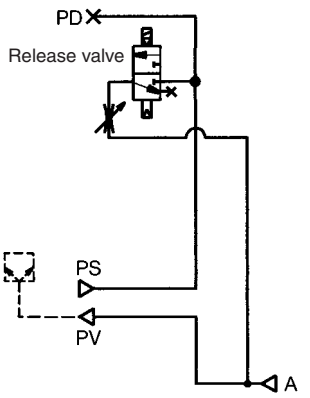


Application: The supply pressure is controlled by an external 2 port valve (vacuum valve) and a vacuum release is effected by the solenoid.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 2 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D2

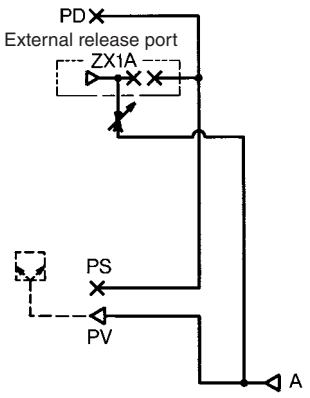


Application: The supply pressure is controlled by an external 2 port valve (vacuum valve) and a vacuum release is effected by the solenoid.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 2 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D3

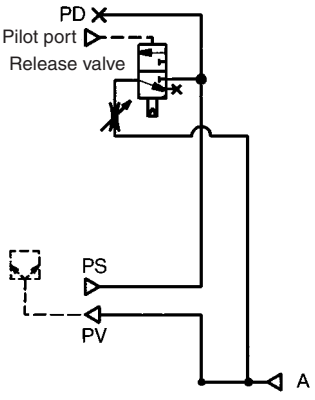


Application: The supply pressure is controlled by the external 2 port valve (vacuum valve) and releasing is also effected by the external 2 port valve.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 2 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Combination Symbol: D4



Application: The supply pressure is controlled by the external 2 port valve (vacuum valve) and vacuum release is effected by external air signals.

How to Operate

Valve / Condition	Supply valve	Release valve
	External 2 port valve	Solenoid valve
1. Work adsorption	ON	OFF
2. Vacuum release	OFF	ON
3. Operation stop	OFF	OFF

Made to Order Specifications:

Made to Order

Please consult with SMC for detailed size, specifications and delivery.

CE

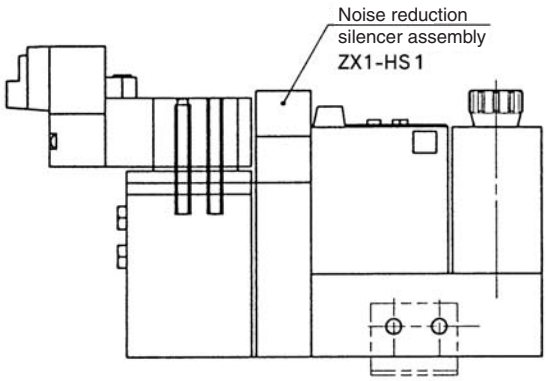
[Option]

3 High Noise Reduction Silencer Assembly

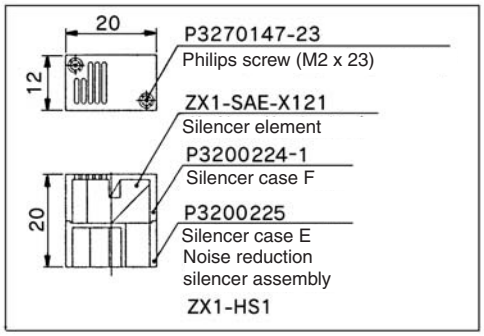
ZX1	Nozzle diameter	Exhaust style	—	Valve	Voltage	Electrical entry	X121	—	CE compliant

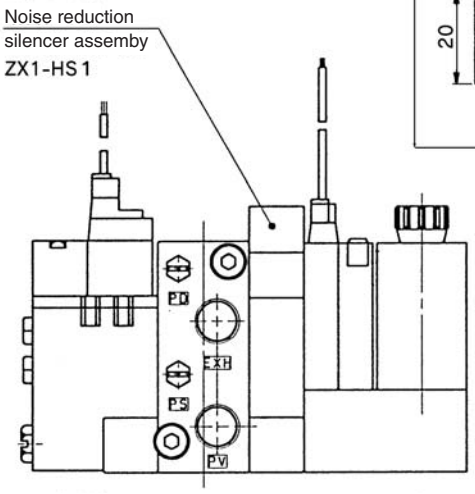
High noise reduction silencer assembly

Reduction in the exhaust noise from the ejector (Silencing effect 8 dB (A) Standard silencer assembly comparison)



Ordering example
ZX1101-K35LZ-D23C-X121





Ordering example

	ZZX102-R	1 pc.
*	ZX1101-K15LZ-EC-X121	2 pcs.